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ABSTRACT

The proceedings of this symposium contain the texts of 21 presentations: (1) "The Alexandriana Library: A New Opportunity in International Library Cooperation" (Stuart Ede); (2) "Conservation, Culture and Curriculum" (Brendan Loughridge); (3) "European Library Cooperation: An EC (European Community) Standpoint" (Ariane Iljon); (4) "Library Cooperation within the Ligue des Bibliotheques Europeennes de Recherche (LIBER)" (Hans-Albrecht Koch); (5) "The Use of New Information Technologies (NITs) in Libraries in the Federal Republic of Germany (Results of The Study EEC-LIB2/5)" (Heinz Habermann); (6) "History of Library Automation: Nostalgia or Advice for the Future" (Morten Hein); (7) "LIBRIS in the Melting Pot" (Lars-Erik Sanner); (8) "Siemens and Library Automation" (Albert Hahn); (9) "The Impact of Technology on the Work of the Subscription Agency" (Jacques Ch. Germain); (10) "MICROMARC: Library System for the PC (Personal Computer)" (Vidar Ingebretsen); (11) "CD-ROM in the Library: It's More Than the Fiche of the 21st Century" (Ellen M. Pearson and Ron McKinnon); (12) "Updating of Online Catalogue on CD-ROM?" (Karl Wilhelm Neubauer); (13) "Multistate Library Networks: A Model for Lay Representation on Library Network Boards" (Louella V. Wetherbee); (14) "European and North American Library Cooperation: Opportunities for Resource Sharing" (David Buckle); (15) "Automated Library Networking in North America: New Realities, Major Trends" (Charles R. Hildreth); (16) "Planning for International Interlibrary Loans" (Collette Mak); (17) "TRANSDOC: European Programme for Electronic Storage and Document Delivery" (Jacques Soule); (18) "Technological Developments Relevant to Library Cooperation" (Michael K. Buckland); (19) "Open Systems Interconnection (OSI): Problems and Possibilities for the Federal Republic of Germany" (Christine Bossmeyer); (20) "Communications Channels and Networks: Facilitating Information Transfer and Exchange" (David I. Raitt); and (21) "Computer Conferencing for Enhanced Communication: Its Potential for Academic and Research Communities" (Ellen M. Pearson). The text is supplemented by various tables, figures, and photographs, and each paper contains bibliographic references or notes. A list of the symposium participants is also provided. (EW)

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International Library Cooperation

Edited by
Ahmed H. Helal
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Vol. 3

Workshop zur Benutzerschulung

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Vol. 4

Future of Library Networks

3-922602-04-5 (out of print)

continued on last page

Günther Plüschow

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Essen University Library

International Library Cooperation

10th Anniversary Essen Symposium
19 October - 22 October 1987

Festschrift in honour of
Prof. Dr. Günther Pflug
to his 65th birthday

Edited by

Ahmed H. Helal
Joachim W. Weiss

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10th Essen Symposium 1987
Essen University Library

INTERNATIONAL LIBRARY COOPERATION

19 October - 22 October
1987

Preface

In conjunction with the **"10th Anniversary Essen Symposium"** more than 100 librarians from 18 countries were invited to celebrate the 10th birthday of the Essen Symposium during the period from 19 October to 22 October 1987. This celebration was more dedicated to **Günther Pflug**, the founder of library automation in Germany and his enormous contributions during his career; who also innovated and inspirated many librarians and institutions to automate, cooperate, collaborate, and to share responsibility for libraries and its clients.

G. Pflug is a colleague of unusual intellect and adapting the spirt of the time "Zeitgeist". He is a keen observer and deep thinker. During the last thirty years he has cultivated close contacts and ties with many colleagues all over the world. With this level of activities it is clear that the developments in Germany did not come to a stand. His philosophy is still based on predicting the dimensions of what can be done, watching what is beginning and to learn from it, keeping calm and analytical.

G. Pflug proved for many librarians in Germany and abroad how computers can be used in libraries and how libraries must move and change from conventional procedures to computerized operations, and how computers might be used in libraries. The developments in library automation in the last twenty-five years which were shaped in Germany by **G. Pflug** have shown clearly that the library world is integrated to a degree even greater than we expected ten years ago. The national and international interdependence is a must. This is the reason for the choice of the topic of the 10th Anniversary Essen Symposium 1987 **'International Library Cooperation'** and its dedication to **G. Pflug**.

Thanks to the rapid developments in modern technology that, today, library automation enterprises are much in a better situation to meet the challenges of library services and research needs than it has been in many years ago. This does not mean that we cannot improve our efforts on the national and international level for more services and performances. The complexities and rapid development in technology will encourage librarians to coop with high-tech situation. The driving force in technological change is the real market which we have to follow and observe to keep the standard of our services. Policies and standardization in the field of telecommunication is progressing and continuous rethinking is still needed.

In addition, the severe international competition in hardware, software, and telecommunication developments forces firms to come up with cheaper and much powerful equipments and services in a very rapid time and cheaper prices.

Amid the excitements of recent international high-tech developments, it is important and necessary to keep things in their proper perspectives. Thirty years ago, serious librarians still asked themselves whether library automation or non-automation is a greater promise for meeting the increasing library community users and their needs. It is now a fact and the debate is over. Today, as **G. Pflug** started more than twenty years ago, library automation and international library cooperation are recognized throughout the world - by users as well as by vendors - as the most powerful impulse to meet the needs of the scientific community.

As we meet this year, we can have good feeling about we have reached. At the same time, this is a moment of historic opportunity for participants and all librarians to thank **G. Pflug** for his courage and leadership in introducing the pioneer work in library automation in a single library (Bochum University Library), cooperative system (HBZ-Cologne), national level (German Library, Frankfurt/M.) and the tremendous efforts in the frame of international cooperation among national libraries (MARC formats and cataloguing traditions).

Three decades ago library automation was considered as utopian, may be naive, or leads to worse services and killing jobs. The reality now as documented by the yearly Essen Symposium that no library or nation can alone ignore or abandon international practices without being badly affected. The big hope of all librarians is more international standardization, cooperation, and agreements that commits everyone to compatible actions within readable timetable. We recognize that this is a very ambitious undertaking but let us all hope that **'International Library Cooperation'** will succeed.

Essen, November 1987

A.H. Helal
J.W. Weiss

10th Anniversary
Essen Symposium 1987
Essen University Library

INTERNATIONAL LIBRARY COOPERATION

19 October - 22 October
1987

Agenda

Monday, October 19

9.30	Registration
10.15	Online presentation
13.15	Opening of Symposium AHMED H. HELAL

Chairman: AHMED H. HELAL

14.00	The Alexandriana Library - a new opportunity in international library cooperation STUART EDE
14.45	Discussion Coffee
15.00	Conservation, Culture and Curriculum BRENDAN LOUGHRIDGE
15.45	Discussion Coffee
16.00	Online presentation
19.00	Reception

Tuesday, October 20

Chairman: GÜNTER GATTERMANN

9.30	European library cooperation - an EC standpoint ARIANE ILJON
10.15	Library cooperation within the Ligues des Bibliothèques Européennes de Recherche (LIBER) HANS-ALBRECHT KOCH
11.00	Discussion Coffee
11.30	The use of new information technologies (NITs) in libraries in the Federal Republic of Germany (Results of the study EEC-LIB2/5) HEINZ HABERMANN
12.00	Discussion

Chairman: LOOK COSTERS

14.00	History of library automation: Nostalgia or advice for the future MORTEN HEIN
14.30	LIBRIS in the melting pot LARS-ERIK SANNER
15.00	Discussion Coffee

15.30	Siemens and library automation ALBERT HAHN
16.00	The impact of technology on the work of the subscription agency JACQUES CH. GERMAIN
16.30	Discussion
17.00	Online presentation
19.00	Reception

Wednesday, October 21

Chairman: PETER NOERR

9.30	MICROMARC - library system for the PC VIDAR INGEBRETSEN
10.00	CD-ROM in the library - It's more than the fiche of the 21th century ELLEN M. PEARSON and RON McKINNON
10.30	Discussion Coffee
11.00	Updating of online catalogue on CD-ROM? KARL WILHELM NEUBAUER
11.30	Discussion

Chairman: WILLIAM J. MITCHELL

13.30	Multistate library networks: A model for lay representation on library network boards LOUELLA V. WETHERBEE

14.00	European and North American library co-operation - opportunities for resource sharing DAVID BUCKLE
14.30	Automated library networking in North America: new realities, major trends CHARLES R. HILDRETH
15.00	Discussion Coffee
15.45	Planning for international interlibrary loans COLLETTE MAK
16.15	TRANSDOC, European programme for electronic storage and document delivery JACQUES SOULE
16.45	Discussion
17.00	Online presentation
19.00	Reception

Thursday, October 22

Chairman: LIV HOLM

9.00	Technological developments relevant to library cooperation MICHAEL K. BUCKLAND
9.30	Open systems interconnection (OSI): Problems and possibilities for the Federal Republic of Germany CHRISTINE BOSSMEYER

10.00	Communication channels and networks: facilitating information transfer and exchange DAVID I. RAITT
10.30	Discussion Coffee
11.15	Computer conferencing for enhanced communication: its potential for academic and research communities ELLEN M. PEARSON
11.45	Discussion
12.15	Summing up DAVID I. RAITT
	CLOSE OF SYMPOSIUM

10th Anniversary
Essen Symposium 1987
Essen University Library

INTERNATIONAL LIBRARY COOPERATION

19 October - 22 October
1987

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THE ALEXANDRIANA LIBRARY
A NEW OPPORTUNITY IN INTERNATIONAL COOPERATION

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THE ALEXANDRIANA LIBRARY
A NEW OPPORTUNITY IN INTERNATIONAL COOPERATION

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Abstract

Planning is gathering momentum for the creation of a modern successor to Ptolemy's Alexandriana Library which was the foremost international focus for scholarship of the ancient world. With the aid of new technology and the application of current thinking on the design of libraries and information services it is hoped that the library will provide Egypt and the Near and Middle East with a powerful resource to assist the development of the region in the technical, medical and economic spheres as well as promoting its cultural heritage.

But how are these aims to be achieved in the real world of financial and political constraints? From the starting point of identifying the services required and where they are needed, ways of using the library's resources to the maximum effect are explored. Questions such as the balance to be struck between a central collection and the use of external services, the use of appropriate technology, the place for revenue-earning services and how the library might reach remote users must be addressed.

The Alexandriana Library Project offers a practical example of how international library cooperation might be applied outside the highly developed world of Western Europe and North America both in terms of what it can do for the surrounding region and what the international information industry can do for it.

THE ALEXANDRIANA LIBRARY
A NEW OPPORTUNITY IN INTERNATIONAL COOPERATION

1. Introduction

In 1985 the University of Alexandria issued a brochure to promote a major new project - to recreate a modern day equivalent of the famous Ptolemaic Library that is commonly regarded as one of the wonders of the ancient world. While the project cannot hope to restore Alexandria to its former pre-eminent position in the civilized world it is hoped to establish a major modern library serving not just Egypt but eventually the Eastern Mediterranean and the Middle East.

The reason why a paper was requested on this topic is to raise the awareness of European and North American librarians to the existence of the project for which a wide range of support is sought. UNESCO has already made a considerable commitment to the project by funding various studies, but success for this mammoth undertaking will also depend upon further support - both in terms of resources and expertise - from individual countries and institutions.

Planning is still in the conceptual phase. Several special studies have been commissioned which at the time of speaking are nearing completion, and the reports of these studies will form a major input to an international round table of experts due to consider the project in March 1988. A further purpose of this paper is to promote discussion on the shape the project should take, which can then be reflected at the round table. Therefore after describing the background to the project and some of the ideas emerging currently, some very personal opinions are put forward on how the author believes the New Alexandriana should develop. These are not intended as the definitive answer to the decisions required but as a means of provoking debate.

2. Outline history of the Ptolemaic Library of Alexandria

Paradoxically the history of the Alexandriana is only patchily recorded, and the historian is dependent in large part upon fragmentary comments by a variety of observers many of whom could be described as having a bias of one sort or another. As a result opinion varies on both the facts and the reasons behind events. Nevertheless a brief attempt will be made to summarize the history of the Alexandriana gleaned from two of the more respected works on the subject (1 and 2).

The City of Alexandria was founded in 331 BC shortly after the conquest of Egypt by Alexander the Great. The invasion of Egypt represented a south westerly excursion from his push eastward. Alexander was crowned Pharaoh in Memphis and then moved towards the Mediterranean cost where he designated an almost virgin site for a new harbour and city that was to become Alexandria. The task of developing the new city was given to Cleomene. His efforts and the city's key position on the coast led to its rapid growth as a port connecting Egypt to the other trading nations of the Mediterranean. So successful was the city that within three years of Ptolemy Soter's takeover of Egypt in 323 BC he proclaimed Alexandria his capital.

It was the fashion of the time for rulers of the Greek settlements and the homeland to patronize the arts and sciences. There was great rivalry between them to attract the brightest stars of the intellectual firmament. Soter entered this with a will and brought leading scholars from other centres such as Cos. He surrounded himself with poets, dramatists, critics and grammarians on the one hand and philosophers, scientists, mathematicians and medical researchers on the other.

To house these scholars a seat of learning was established, the Mouseion. This academic centre flourished under successive generations of Ptolemys, and Euclid, Archimedes and Appollonius of Perge are known to have spent time studying there. All this scholarly achievement was not without its practical application, and Alexandria became a leader in ballistics research leading to the invention of the torsion catapult.

The rapidly accumulating wealth of learning led to the appointment of the first Librarian, Zenodotus, who held this post from 285 to 270 BC. The post of Librarian was for many years combined with that of tutor to the Royal children. Under the energetic management of the early librarians the Alexandriana Library (or rather libraries, there being two, one within the walls of the Mouseion and one without) grew to be the foremost in the ancient world. At its height it contained half a million rolls of manuscripts. Besides the scholarship of its academics a key factor in the development of the Library was its position as premier trading centre and the Ptolemaic law that every book on board visiting ships should be copied and deposited in the Library.

For several generations the Alexandriana flourished, but the first body blow was dealt by Euergetes II when he expelled the scholars in 145 BC. While it never quite attained its former reputation as a centre of learning it nevertheless continued as a major resource until the Library was largely destroyed by fire in 48 BC during Caesar's Alexandrine War. How much of the building and its stock survived is not clear, but this was not to be the end of its life. It was re-established by Anthony's gift to Cleopatra of 200,000 books from the Pergamene Library.

Scholarly life continued under Roman rule and indeed the Mouseion was enlarged during Claudius's reign. However, after its resurgence under the Romans it entered a steady decline that led to the eventual break up of the collection, the circumstances of which are not very well documented.

3. The library scene in Egypt today

Egypt has a population of 55 million increasing at over 3 % per year to a projected total over 70 million by the year 2000, for a country of its current economic status it has an appallingly low literacy rate of 43 %.

Library provision is very poor. Few public libraries exist outside Cairo and those that there are suffer from inadequate premises, old equipment, outdated bookstocks and tiny book funds. The Municipal Library of Alexandria has a book fund of less than $ 1,000 per year, incomprehensibly low by Western standards.

Poor funding is also a feature of university libraries. Acquisition funds are controlled by academic departments who do much of their buying at the Cairo Book Fair. Typical budgets are £E 5,000 for a medium sized faculty and £E 2,000 for a large individual department. Moreover this must be equated with a national student population of 0,5 m and an output of 150,000 graduates each year. The situation is not helped by the system of learning in Egypt's universities. This depends in large measure on rote learning of arabic texts prepared by the academic staff who use the sale of the often photocopied texts to supplement their meagre incomes. There is therefore little incentive to develop libraries. Only at the University of Suez are students encouraged to pursue their own studies, and the role of the library is fully accepted in supporting this policy.

Nor can the National Library provide adequate leadership. Comparatively well endowed with staff (a legacy of the Nasserite policy of full employment for graduates) having 600 staff including 100 professionals, it has to struggle with poor conditions housing its small stock of 750,000 volumes (including 12,000 foreign language titles) and only 2,500 journals.

Hand in hand with meagre library provision goes the low professional status of librarians. Symptomatic of this is the failure of the Egyptian Library Association in 1973. Pay is poor for the annual 300 graduates of the four library studies departments, which provide only limited training facilities. Like other graduates many join the "brain drain" to other Middle Eastern countries for the better rewards they can offer.

Efforts are being made to change this bleak picture with the help of aid money. In 1979 the Egyptian Society for Information Technology was set up as part of an aid programme funded by the International Islamic Bank. The Society is stimulating the development of information systems especially in the special library sector of which a survey three years ago revealed only 152 "significant" libraries.

In a programme begun in 1980 USAID has been funding the implementation of the National Scientific and Technical Information Plan. Key features of the Plan are the development of information services, management of Egyptian information, user education and the marketing of information. The Plan is being administered by the Egyptian Academy of Scientific Research and Technology with advise from the Georgia Institute of Technology. A focus for the Plan is the new National Information and Documentation Centre, the aim of which is to provide information retrieval and current awareness services, to act as a publisher and to provide training and consultancy. Other centres are being set up under the Plan (in some cases with additional support from other agencies) cover the areas of agriculture, energy planning, engineering and industrial design and educational technology.

Aid comes in other forms, too. Notable examples are the British Voluntary Service Overseas and US Peace Corps providing volunteer manpower, the training of librarians at Alexandria University by Essen University Library staff led by Dr. Ahmed Helal and the British Council's book presentation scheme to universities and technical colleges and its assistance with a mobile library facility for the National Library.

However, no matter how worthy or effective these aid programmes are, the problem of developing Egypt's library and information services such that they can stimulate and support the country's growth is still daunting and requires further effort.

4. Aims of the New Alexandriana

Against this background the University of Alexandria proposed in 1985 the creation of a new public research library to provide modern facilities to serve not only the University but also Alexandria (where 40 % of Egyptian business is situated), Egypt as a whole and eventually the Eastern Mediterranean and Middle Eastern regions. Alexandria's role in the region is already recognized in that it is home for the World Health Organization regional office and for the Arab University which moved there from Beirut. The New Alexandriana is intended to re-establish the region's scholarship.

The Egyptian Government, realizing the importance of information in supporting development, has included the scheme in its 1987-92 five year plan, and President Mubarak is patron to the project. The University has set aside a prestigious 55,000 square metre site overlooking the sea in the area where the ancient Library and Mouseion stood. The site includes a large conference centre to be part of the complex. In addition to funding by the Egyptian government the Governate of Alexandria will be contributing to the estimated $ 160 m cost of the project, but such is the scale of it that a major international fund raising exercise is planned.

UNESCO has already supported much of the initial planning including a feasibility study by Jean-Pierre Clavel and Jacques Tocatlian (3), a study tour of Europe and the USA by leading members of the project and several special studies of particular aspects. At the time of writing these special studies are completed, but the reports are not available. However, Clavel and Tocatlian recommended the main targets and features of the project which have been agreed by the Alexandriana Steering Committee.

5. Key targets and features

Since planning is still at the conceptual stage, inputs from forums such as this Symposium will no doubt be welcomed to help shape the project. Indeed this paper is put forward to both inform and provoke comments. In addition to the key targets and features already set out will be added the author's view of the way forward which differs in some aspects and emphases from current recommendations.

The target opening date adopted is 1995. By then it is hoped to have assembled 200,000 books and back runs covering 20 years for the intended 1,500 current journals. Two thousand reader places will be provided, i.e. one place for every 20 of the 40,000 students of the University at 3 square metres each. A combination of open access and closed stacks will be adopted as a compromise between ease of use and the most economic use of space. An integrated library system will be installed.

Leading up to the opening an intensive training programme is planned to provide the skilled personnel required to run the Library. This will be coupled with a campaign to raise the status of librarianship in Egypt. Furthermore the building is planned to accommodate the University of Alexandria Department of Library and Archive Studies, so that its students can benefit from working within a modern library.

The Library is eventually intended to cover all subjects, but to spread the cost of acquisition it has been decided to begin with a restricted range and expand to other subjects from there. First priority has been given to history and culture on the grounds that a new Science and Medical Library has recently been set up with advice from West Germany, and that the two existing Arts Faculty libraries are in such a poor state. One has only a few hundred volumes and no working space for staff, and the other possesses a tiny reading room with closed access stock accessible only via a very poor card catalogue. No doubt the emphasis on history and culture will also make neighbouring states more amenable to funding the New Alexandriana.

The subjects recommended to be covered initially include:

Egyptian art history
Greco-Roman archaeology and papyrology
Greco-Roman language and literature
Coptic art history, history and oriental monachism and patrology
Coptic language, literature, culture and civilization
Middle Eastern ancient geography to the Middle Ages
Islamic/Arab history, art, civilization, language and literature
History of ancient science and medicine to the Middle Ages
Regional modern and contemporary history

Only later will the acquisition policy expand to cover modern sciences and technology and more general collections.

The author finds this order of priorities disturbing. Firstly a collection with this profile is likely to mean that the new building will be greatly underutilized. Secondly it does not address the desperate needs of the region for information to promote industrial, agricultural, medical and economic progress.

While it is a worthy aim to preserve the cultural heritage of the area from the on-rush of modernization, this could be achieved on a more modest scale. Moreover the fact that a modern science and medical library exists should not be taken as the reason for neglecting this side of the Alexandriana's development. Rather it should be used as a basis on which to build a truly country-wide or regional role providing information and document supply services to industry etc. Such services can generate revenue through sales of services which can contribute to the running costs of the Alexandriana, thereby reducing its dependence on scarce public funds and supporting the development of the historical and cultural collections.

An autonomous quasi-national status within the University has been suggested for the New Alexandriana. This would have the advantage of enabling it to meet its wider role beyond the confines of the University. However, by being a separate entity from the Science and Medical Library with its own Librarian will seriously hinder exploitation of the science collections for the benefit of industry, agriculture and regional health. A more appropriate organization might be to incorporate the science collections and services within the control of the Alexandriana Librarian responsible to a governing body comprising representatives of the University and national and local government.

6. Service priorities

The service priorities recommended by Clavel and Tocatlian tend to reflect the proposed priorities for collection development. Lending, reference, interlending, photocopying, microform reading facilities and access to databases come in the first tier followed by assistance with bibliographic research and dissemination. Audiovisual and music facilities come next, while the establishment of a host centre for databases is given lowest priority.

If, as the author hopes, the subject emphasis and initial role of the Alexandriana are reviewed, then it is to be hoped and expected that the service priorities will also be changed to make the new library reach out to its wider potential customer base. In this way it will achieve a comparable international impact to that of its illustrious predecessor, which was famed equally as a centre for scientific and medical advance as it was for studies in the humanities.

7. The project timetable

1986 saw the request for UNESCO support and an international conference on the ancient library. 1987 was then the scene of intense activity. The initial feasibility study by Clavel and Tocatlian was followed by the study tour of Europe and the US. Preliminary decisions on the key features of the Library were then taken, and the detailed studies by five international experts were commissioned on the automation and database requirements, Arabic language acquisitions, staffing, training and the integration of the Library School and the architectural brief.

A major event in 1988 will be the holding of an international round table of experts to examine the consultant's reports, initiate the intended architectural contest and act as a launching pad for the appeal for funds. UNESCO will be providing financial support for the round table and further support is being sought from appropriate donor agencies in individual countries. UNESCO is also expected to underwrite the architectural contest to be supervised by the International Union of Architects aimed at attracting a design worthy of the status of a modern Alexandriana.

The task of collection building to include the acquisition of journal back runs and reproductions of ancient manuscripts is hoped to begin in 1988. Just how the acquisitions will be processed and stored needs to be worked out, though assistance will be provided by the University Science and Medical Library. The first UNESCO funded study grants for the training of key staff will also begin in 1988.

1989 should see the letting of building contracts and selection of the automated library system. From then on there will be the intensifying work of preparing for the opening of the New Alexandriana in 1995.

8. Constraints

There is no doubt that the Alexandriana project faces some daunting problems and constraints that may hinder its realization and its continued operation thereafter. The most obvious constraints will be financial. Even assuming the successful raising of the launch funds will Egypt be able to maintain the long term budgetary commitment necessary to ensure the project thrives? Desperately needed foreign exchange will have to be set aside for the purchase of the Library's intake of foreign publications. And as journal prices continue in their inflationary spiral the problem will grow.

Obviously the more it can generate its own revenue from the sale of services, the more likely the Alexandriana is to develop rather than become moribund through lack of funds. This further underlines the necessity of an outward looking library with strong scientific and business information services firmly oriented towards satisfying its customers' needs.

While a manpower programme is being planned, the problem of staffing will still be especially difficult. Starting with the lack of trained librarians and a virtual absence of computer expertise it will require super-human efforts to create the skilled personnel necessary. The low status of librarianship and associated low pay will mean that the brighter staff will inevitably be tempted to join the "brain drain" to the oil rich Middle Eastern countries.

Political constraints may severely hinder the achieving of the regional role sought for the new Library. Egypt is slowly emerging from the political isolation in the Arab world that resulted from its peace treaty with Israel, but there is a high level of tension with its neighbour Libya, and within the country the growing tide of fundamentalism threatens to place restrictions on learning.

9 International support

This awesome problems make it clear that international assistance is essential if they are to be overcome. UNESCO's substantial involvement has already been outlined. This is backed by the support among member countries for a resolution requesting the Director-General to launch an international appeal on behalf of the Alexandriana (4).

Statements of support have been made by the American Library Association and by various organizations and groups in West Germany, Greece and Italy. It is to be hoped that these will be translated into action when the time comes.

The assistance needed will not just be financial but through the provision of expertise, too. In addition to the international figures to be invited to attend the round table next February, consultants will no doubt be needed to guide the project through to its completion. They will have to apply the most appropriate solutions from countries with more developed library services to the context of Egypt in a way that is sympathetic to local circumstances.

10. The planning opportunity

The Alexandriana offers a wonderful opportunity to plan a wholly new library - a chance to learn from the errors of the past and apply some of the latest thinking on the problems that confront libraries today. The thoughts that follow represent the author's view of the main issues and some possible solutions to them. Rather than providing a definitive answer they are intended to provoke comment from which can be gleaned a reasonable consensus on the way ahead. But please note that they should be read in the context of the author's desire for the Alexandriana to give higher priority to scientific and business information services for the region's industry.

The obvious starting point for planning is the intended role of the Library. This should be examined in the light of the potential customer base and the customer's/reader's needs which might relate to:

- research
- teaching
- learning (i.e. students' self directed study of their subject)

In meeting those needs the Library should be seen as not simply a collection of information materials, but also as a bibliographic information service drawing the attention of its customer's to what is available, and a switching centre providing access to documents held beyond its own collections.

This latter point raises the issue of the balance to be struck between attempting to acquire as much as possible (i.e. holdings) and relying on external sources where appropriate (i.e. access). The balance to be struck will depend on the availability, range, easy of use and relative cost of external sources of documents. Such sources may be national (e.g. NIDOC in Egypt), international(e.g. the British Library Document Supply Centre) or both (e.g. cooperative networks). Increasingly quantitative indicators are being applied to the holdings versus access decision. Measures such as the cost per journal use can help determine the economic balance, though this must be set against the less readily quantifiable factors of browsing, current awareness and speed of access. Recent research suggests that 15 photocopy requests per year is the level at which it becomes more economic to buy a journal.

There is a growing emphasis on service to customers rather than simply providing a resource for them to use. But this is labour intensive, and staff effort has to be released from elsewhere. An obvious source of manpower is technical services. The use of shared cataloguing systems is quite widespread and can save effort, but only if the cost is low and the hit rate high and timely. Sometimes it can bring with it the penalty of having to catalogue a library's unique material to higher standards obviating much of the projected saving.

A school of thought that is gathering momentum (and to which the author subscribes) believes that it is more cost effective to put resources into helping customers retrieve items at the time of search rather than investing in complex cataloguing and indexing schemes when even the most effectively selected collections will contain large numbers of items that will rarely or never be used. Studies have shown that short entry cataloguing can give rise to a 40 % saving in effort but still satisfy 97 % of users' enquiries (5). This is reinforced by the advent of the online public access catalogue (OPAC) providing the user with multiple access points with keyword and Boolean search capabilities, obviating the need for complex headings structures. All this enables the shifting of staff resources towards providing better enquiry support and better user education possibly delivered through subject oriented teams.

Technology is also offering a new approach to library and information service planning. Advanced telecommunications, e.g. via satellite, are making the databases of the Western world much more accessible from the various corners of the globe. However, the connect time and telecommunications costs can still be prohibitive to less well-off nations. Here the CD-ROM may come to the rescue bringing major databases within the realm of the desktop microcomputer and allowing unlimited access plus the flexibility of online search methods without the telecommunications overhead. And CD-ROM may even put major collections of documents at one's fingertips as the ADONIS experiment is currently exploring (6).

11. Guiding principles

The foregoing can be developed into a set of guiding principles that the author would like to see applied to the new Alexandriana. Again they should be viewed in the context of a Library with a commitment to the provision of scientific and business information services to a large remote customer base in addition to its role in supporting historical and cultural research.

With regard to services the key features should be:

- an accent on information provision to meet current needs
- good bibliographic facilities
- good enquiry and SDI services
- maximum access (e.g. via OPACs)
- the appropriate application of technology

On processing the aims should be:

- wide, cheap selection of books (for instance giving more responsibility to booksellers to meet defined profiles thus enabling staff budget to be translated into book buying funds)
- journal selection optimized (vis a vis external sources)
- fast, cheap processing (material should reach the shelf quickly with the minimum of expenditure on cataloguing)
- minimum cost binding (compatible with the type of material and its use, e.g. journal part binding as adopted by the BLDSC)

Storage should not be a problem for many years, but when full capacity is beginning to be reached the Library should consider selective retention, discarding lesser used books in subjects where information has a short "shelf-life". "Deselection" as it is called has a cost attaches to it, but with the provision of management information from an integrated library system it is considerably easier than in the past and is much cheaper than a never ending building programme.

Lastly the author would like to see a strong emphasis on revenue earning services. If the services are properly targetted to meet the needs of the potential customer base there will be a willingness to pay for them, especially as the value of information in aiding development is increasingly appreciated throughout the world. By enabling the Alexandriana to stand at least partially on its own feet, it will be less vulnerable to the vagaries of public funding for its continued operation, and it will have much greater control over its own resources for further development. Moreover the richer sectors of the customer base can thereby be made to subsidize the less commercially viable but culturally important services.

12. Conclusion

These guidelines reflect the author's personal view of the priorities for the New Alexandriana. No doubt there are other equally valid opinions on the subject, and it is hoped that this paper will open a lively and informative debate from which the

Alexandriana Steering Committee can draw appropriate conclusions on how the project should be approached.

Two essential truths should, however, stand out from the wealth of opinion. The first is that in order to attract the hoped for international support the project must be seen to meet the real needs of the region. Secondly it should complement and be coordinated with other initiatives in the area to ensure the most effective use of resources in contributing to the economic, social and cultural health of the people.

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CONSERVATION, CULTURE AND CURRICULUM

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CONSERVATION, CULTURE AND CURRICULUM

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Abstract

This paper reviews the debate on the place of education for conservation and preservation of library and archive materials in the curriculum of departments of library and information studies, with particular reference to recent activities in the United Kingdom. Over the past five years or so increasing attention to the problems of conservation and preservation has been encouraged by the findings of the Ratcliffe Report and by the foundation of the National Preservation Office in the British Library. In addition to growing awareness of and interest in the technical, technological financial and managerial aspects of planning for conservation and preservation there has been much public debate within the profession about inadequate provision in the curricula of "library school" for the teaching of conservation matters and about the relative values and priorities of conservation/preservation vis-a-vis, for example, information technology and management theory and practice. This paper attempts to relate conservation/preservation issues to the general cultural and particular technological imperatives operating within the field of professional education for librarianship and information work and suggests that the current interest in conservation/preservation problems is once more encouraging interest in the wider cultural context and responsibilities of libraries as well as encouraging the search for technological solutions to some of the problems of both teaching the theory and fostering the practice of conservation and preservation.

CONSERVATION, CULTURE AND CURRICULUM

> " Wer, wenn ich schriee, hörte mich denn aus der Engel Ordnungen? Und gesetzt selbst, es nähme einer mich plötzlich ans Herz: ich verginge von seinem stärkeren Dasein." (1)
>
> Who from the angelic orders would hear me if I were to cry out? Even assuming one of them took me suddenly to his heart I would transpire in the face of his greater being. (my translation)

The angel of Rilke's first Duino Elegy - strong, seductive, and yet remote and potentially destructive - to whom the lone poetic voice appeals, a metaphor of twentieth-century existential crisis, may, with care, be appropriated to epitomize the principal theme of this paper: the crisis of professional identity currently facing those who see in the concatenation of a growing conservation crisis in libraries throughout the world and accelerating technological development, information technology in particular, a major threat to the traditional humanist role and functions of academic and research librarianship. The underlying theme of the paper, as of the debate which it attempts to describe in outline, is the evaluation and revaluation of inherited cultural assumptions and presumptions and how these can or should be reconciled with the developing technological culture which many would regard as the defining culture of our age. Reference will be primarily to the public debate within the library profession, and specifically to the debate between practising librarians and the representatives of schools of librarianship and information studies, which has developed in the United Kingdom since the publication of the Ratcliffe Report on conservation and preservation in British libraries in 1984 (2).

Apart from its achievements in increasing public and professional awareness of the problems facing conservators and librarians this debate has been especially noticeable for the way in which it has both stimulated argument about the aims and objectives of professional education and training and highlighted the current confusion in the profession at large about the role and functions of the library and the librarian in the so-called Information Age. It has certainly exacerbated the situation of those concerned with the development and design of the curriculum for professional education of librarians and information workers, for one of the main aims of those involved it the publicising of the conservation crisis has been to persuade educators of the centrality of conservation to the curriculum at a time when the educators are struggling hard to keep abreast of other demands for increased attention to information technology, management and financial and budgetary affairs. To some extent the noticeable acerbity of tone, particularly in the contributions of the educators, is attributable to the tensions and stresses arising from more or less continuous revision of syllabuses but also, and perhaps more importantly, to uncertainty and confusion about what both the short-term and long-term implications of current technological developments are likely to be, especially with reference to the employment prospects of their students.

That there is a conservation crisis of potentially catastrophic proportions there can be little doubt. The magnitude of the problem and the implications of ignoring it may be judged by the conservative estimation that roughly 25 % of all library collections everywhere are threatened by sure and certain destruction or irreparable damage directly attributable to a combination of poor quality papers and inks with high acid content, environmental pollution, inadequate and inappropriate storage, the depredation of an exotic variety of animals, insects and other biological pests and last but not least to mal-treatment by those charged with their care and maintenance and by ordinary users. It has been estimated that a programme for the preservative treatment of brittle books in the United States alone will cost in the region of $ 400,000,000 while the British Library has calculated that it needs to spend as much as £ 30,000,000 on its general conservation programme. (3) That the crisis and the problems are not confined to developed or advanced societies should be equally obvious, though the specific problems endemic to particular regions may differ, depending as much sometimes on climate and weather and geography as on dominant cultural values. Various international bodies and organizations have recognized the ramifications of the crisis. IFLA, for example, organized an international seminar on the topic in Vienna in 1986 (4), and has a Core Programme on Preservation and Conservation (5). UNESCO, within its RAMP project (Records and Archives Management Programme), has commissioned a series of reports on such matters as 'the preservation and restoration of photographic materials, vacuum freeze-drying of water-damaged archival materials and library materials and curriculum design and development (6).

If the problem were solely one of finding the enormous economic resources considered necessary for the effective preventative and restorative treatment of materials already turning to dust there might be little to be argued about, apart from how to obtain the necessary funds. The situation is, however, rather more complex than this and discussion of the crisis has broadened, at least in the United Kingdom, into a more general consideration of the importance and centrality of conservation issues relative to all the other matters with which librarians and archivists must be concerned to-day. It is not without significance that a recent publication from the National Preservation Office at the British Library, containing the texts of papers read at the first of its annual seminars on conservation in 1986, is entitled "Conservation in Crisis" rather than "Crisis in Conservation" (7). The original title of the seminar "Conservation: our Achilles Heel?" gives some clue to the problem by suggesting that conservation has, for whatever reason, been too long ignored, that it is in fact the area where libraries have been left most vulnerable and that if neglected it is likely to have catastrophic consequences. The organizers of the seminar had not only recognized the existence of a conservation crisis but had also realized that there was another, related and equally serious crisis impending - that of the failure of the profession at large, and those of us concerned with the education and training of professional staff in particular, to assign an appropriately prominent place in our syllabuses and duties to education for conservation and to the care and maintenance of all kinds of library and archival materials. There simply are not and are not likely to be enough professionally qualified staff with the appropriate experience and skills to cope with the physical and managerial aspects of the crisis. The purposes of the seminar, both implicit and explicit, were, therefore, to consider ways and means of integrating conservation and preservation into already overcrowded course programmes and to look at the wide range of topics that should be included.

The seminar dealt with, amongst other things, the role of science and technology in education for conservation, the implications for preservation of newer information storage media, and disaster control planning as well as with the more familiar and conventional aspects of archives conservation. Conservation was not, therefore, considered as a comparatively parochial matter, confined to matters of restoration of fine bindings, the proper storage of incunabula or the repair of manuscripts. Rather the problems were seen to encroach upon the world of information technology as well since it is obviously of prime importance to those concerned with the electronic manipulation of data that such data should not be corrupted or otherwise rendered ineffective and that the media used for its capture and storage should be suitably stable and resistant to decay. One contributor to the seminar pointed out that twelve months is the commonly accepted lifetime for the safe storage of data on magnetic media (8). He also suggested that the major characteristics of magnetic media, while making them ideal for active exploitation of documents, generally made them poor media for preservation. Noting the massive problems relating, for example, to questions of authorship, copyright and obsolescence raised by the developing use of non-print media, he also underlined the generally short life-spans of various data storage media; for example, while the archival life of well-kept printed media and microform might be infinite, depending on methods of storage, the life expectancy of read-only or direct read-after-write only optical discs and CD ROM could be as brief as ten years. To which one might also add the seemingly widespread assumption amongst suppliers of library turnkey systems, at least in the United Kingdom, that the estimated life-span of any system might have to be regarded as being as short as six or seven years.

The conservation and preservation problem is, therefore, of concern not only to conservators, historical bibliographers and rare book librarians but to those concerned with the development of computer-based systems as well. It should also be of concern to a conference on the theme of international cooperation because cooperation may be taken to imply the sharing of resources, perhaps even the physical sharing of resources. As was pointed out by the Librarian of the University of North Carolina recently the physical sharing of resources may shorten the life of the material exchanged yet the intrinsif such materials may be entirely lost if the materials are not lent or shared (9). He went on to argue, however, that resource sharing is one of the least of the threats, if not the least, to collections and suggested that the major threats are the paper on which the materials are printed and the environment in which they exist on the shelves. His estimate was that at least one third of all books on the shelves of American libraries are under threat. The threat to electronic storage media may be less exotic than the colourful collection of bugs, ants, mice, rats and other animals currently chewing their way through library collections but are none the less real for all that; though technological developments such as increased free-text storage and retrieval may, to some extent, ease the problem of deteriorating hard-copy, they may bring their own conservation and preservation problems.

I would like to suggest, and hope to use the British experience over the past few years by way of illustration, that the growing realization of the magnitude of the conservation problem on the one hand and, on the other, the new problems raised by developing technology, have together inspired a spirited debate about matters of quite fundamental concern to all who are professionally involved in the acquisition, organization and exploitation of knowledge and information. Though the debate has ostensibly been about the place of conservation and preservation studies in the library school curriculum it has expanded to encompass, sometimes implicitly and sometimes explicitly, the responsibilities of librarians in the provision of adequate library services for scholarship and research in the humanities. In some instances the debate has also brought into the open what might be interpreted negatively as a backlash from scholars in the humanities and those concerned with the provision of suitable library facilities for them or, positively, as signs of a growing awareness of and interest in and familiarity with computer-based systems by scholars in the humanities. There have been forceful calls for the restoration of book-based skills to the curriculum and critical, sometimes very hostile, allusions to the impact of information technology on both library services and curriculum content. There seems also to have been a strong underlying concern about the way in which developing technologies and the libraries' necessary response to these as well as librarians' growing awareness of and, indeed preoccupation with, the economics of information provision, have tended to favour scientific research. This has, in some quarters, developed into a debate about cultural values, however we define "culture", and has, sometimes, seemed to reinforce strong atavistic tendencies amongst some academic librarians in particular. While the debate has generally been a useful contribution to the continual self-examination and self-appraisal which teachers and practitioners alike have to pursue in order to provide the most appropriate courses and services it has occasionally taken on the aspects of a quarrel between *les anciens* and *les modernes*, between those struggling to keep alive old, traditional concepts of scholarly librarianship and those eager to adopt and exploit the latest technological developments in information provision.

In this context acknowledgement should be made of substantial contributions from two eminent German scholars in recent years, namely Professor Bernhard Fabian in his book on *Buch, Bibliothek und geistes-wissenschaftliche Forschung* (10) and Professor Paul Raabe in his monograph *Die Bibliothek als humane Anstalt betrachtet. Plädoyer für die Zukunft der Buchkultur* (11). These two works have, in their different ways, developed topics that bear closely on the debate in the United Kingdom since they elaborate eloquently and elegantly the theme of traditional book-oriented and paper-based information systems coming to terms with newer media and with the implications for scholarship and research of increasing library dependence on computer-based systems. In addition one might refer also to Professor Fabian's keynote address to the British Library colloquium on British resources for German Studies in 1985 (12). This succinct summary of the current state of humanistic scholarship, of the library needs of scholars in the humanities and of what is currently known or understood about their research behaviour and methodologies, builds on and, to a great extent, confirms research carried out in Sheffield some ten years ago (13).

He refers to the impact which severe economic constraints since the late 1970s have had on library collections, noting in particular that as a result of a period of severely reduced budgets the physical conditions of collections has deteriorated and the damage done to collections by excessive use and copying in this period has further exacerbated the conservation crisis. All this, as Professor Fabian notes, has occurred in a period when libraries have also had to cope with major technological change. The same themes - deterioration of collections on the one hand and, on the other, massive capital and recurrent expenditure on technology - were taken up by other contributors to the colloquium, most noticeably by John Flood, Deputy Director of the Institute of German Studies in London, who suggested:

> Technical innovation is by no means always the blessing it is hailed to be ... Information technology, something the government sets great store by, is as yet and indeed for the foreseeable future of limited usefulness in the humanities... In the humanities at least, books are likely to retain an overwhelming importance in teaching and research for years to come. Given the situation of cuts, cuts and more cuts in the area of periodicals and monograph acquisitions it is not surprising that some teachers in the humanities react angrily to the prospect of ever-increasing expenditure on technology (14).

He then went on to argue that in this context to postpone conservation measures, especially for books and periodicals in the humanities, where older material tends to retain its usefulness for much longer than in the sciences, is surely a false economy.

At a recent British Library/SCONUL/Royal Society sponsored seminar on "Scholarly Communication in the Electronic Age" one Speaker reported research indicating that while awareness of new technology amongst researchers had increased sharply most people still preferred having access to the printed versions of materials and that browsing was still a vital activity while another suggested that it would be at least ten years before electronic publishing seriously threatened print-on-paper. Others referred to the development of "electronic closed shop groups" replacing "the invisible college" and of librarians' fears that were gradually being eliminated from the whole process of research, publication and dissemination of results (15).

These are views which may also, of course, be represented in library schools. On the dilemmas facing the curriculum planners of the future the Head of the School of Librarianship and Information Studies at the Polytechnic of North London told those attending the first British Library seminar on conservation in crisis:

> The advent of the audiovisual media caused a kind of displacement effect on the treatment of the book as a physical object. There followed a rather crude syllogistic form of reasoning: we do not need to know how audiovisual media are made, the book is a medium, therefore we do not need to involve ourselves with its technological base... The centrality of print media received a further blow as the Siren voices of information technology lured us further off course, and it is going to be a long haul finding the road back. Attitudes will be difficult to change. There is no logical reason why the welcome developments in information technology and expert systems should have eroded the humanities base of our profession; yet to be identified too closely with humanistic reasoning can retard the development of a professional school (16).

He went on to suggest that "librarianship and information science is rooted in the past - in the study of evolving forms of documentary communication" and that this approach is essential to a common core curriculum in the education of librarians and information scientists. He concluded by emphasizing the reliance of a text's interpretation and authentication on its "context", namely on everything which conveys and goes along with the text itself and suggesting that the transfer of data to other media will distort the message if the context is lost (17).

Similar concerns have been expressed by senior staff of the largest academic and research libraries in the United Kingdom, including the Librarian of the University of Cambridge, Dr. F.W. Radcliffe, author of the report on conservation and preservation in British libraries which proved to be catalyst for much of the current activity in that field in the United Kingdom. He has referred to the longstanding curatorial and custodial role of the librarian as being of the essence of librarianship, commenting that:

> "Given the preoccupation in library school courses with the new technology, computer applications and information science, and the absence of books and bibliography from the curricula, it is easy to believe that the book is no longer a real presence in libraries ... It seems certain that the bread and butter tasks of librarianship will remain and conservation must stand high among those on that list....The importance of the book in libraries, its claims on library school curricula, need no further justification" (18).

He ends by quoting another library school head, Professor Havard-Williams, who, replying to Dr. Ratcliffe's questionnaire on training for conservation, wrote:

> One felt that one had betrayed one's own heritage and the fine training one had received, and sold one's heritage for a mess of potage, in other words, a minicomputer (19).

Similar sentiments have been expressed by Barry Bloomfield, a senior member of staff of the British Library:

> Custodial and traditional skills are at least as important as human, technical and communication skills and must be restored to parity in the professional curricula of our library schools (20).

Elsewhere, the primacy of the traditional book has also been persuasively defended by no less a person than Daniel Boorstin, when Librarian of Congress. In his report to Congress in 1984 he tried to set the book in the context of developing information technologies:

> "The traditional book, of course, lacks the novelty, commercial hype and futuristic romance that surround more recent technologies of communication. While exploding newer technologies have excited attention and the interest of the newspaper and magazine press, interest in reading, enthusiasm for books and the prosperity of the book publishing industry have remained relatively stable... Newer technologies have created new inducements to read books"(21).

A much more polemical approach has been adopted by Roszak, in his argumentative and provocative but highly stimulating book The Cult of Information where he develops his argument that the preoccupation with information as neutral manipulable data which, he claims, is typical of the "information-processing" rationale of computer-based systems, constitutes a threat to traditional humanist ideals, values and methodologies (22).

The extent to which the conservation lobby, from which many of the views already quoted have emanated, has managed to excite debate and influence attitudes and opinions, through seminars and publications and through the activities of the National Preservation Office of the British Library, is neatly summarized by Dr. Clements, Director of the Preservation Service of the British Library:

> Raising the general level of awareness is, inevitably, a slow process but since 1980, there is real evidence of a changing view - to the point now reached when preservation has become "fashionable" and even threatens the supremacy of new technology at certain levels of discussion... Equally, as the National Preservation Office now begins to visit libraries and discuss preservation problems with them, it is clear from the very positive welcome that a climate of concern has already been created. What is also clear, however, is that information, education and resources (management and technical skills, staff, materials and workshop facilities as well as funds) are needed urgently if this climate of concern is to be converted into positive policy and planning at national, regional and local levels (23).

The pressures being exerted through our national and major academic and research libraries on library schools to change their curricula have been accompanied by similar campaigning by the Library Association and the Standing Conference of National and University Libraries, the former deploring the neglect of conservation in the curriculum and the general lack of awareness of the problems, the shortage of expertise and the paucity of funds available to remedy the situation and the latter calling upon library schools to find a place for conservation in their curricula (24).

There would seem, therefore, to be a substantial body of support within our national, academic and research library communities for the re-assertion of those values generally recognized as being more closely associated with the concept of the library as, in Professor Raabe's words, a 'humane Anstalt", than with the concept of the electronic library or the "wired society". It is a characteristic of the case currently being made for greater attention to be paid to conservation and preservation that these are understood in terms of cultural traditions and of a perceived professional responsibility for the protection and custody of the "memory" of civilization as much as in terms of the technical aspects of dealing with specific problems arising from environment, pests, storage or materials used or of the managerial implications. Professor Havard-Williams, for example, has suggested that it is important that students and librarians should be aware of the cultural environment in which the concept of conservation or preservation is accepted, understood and appreciated :

> The values of to-day's consumer society, together with the ever changing development of the new technologies does not help students' appreciation of the importance of continuity, respect for *fonds anciens*, rare books, either of older or more significant origin (25) .

This brings us back to the UNESCO RAMP project already referred to, for one of the documents published under UNESCO auspices specifically refers to an enquiry into the current state of the world's "patrimony" (26). In England it is often said, humorously, that while the Germans have "Kultur" and the French have "la civilisation" and the Austrians have a certain "je ne sais quoi" the British themselves have "a way of life"; it is , perhaps, not accidental that while the British, to whom the term "patrimony" may not always be comprehensible, have become agitated about the conservation of printed and manuscript resources to the extent that the British Library has now introduced an "Adopt a book" campaign with the support of pop music and other television personalities, it is in fact a German who has actually published the most substantial monograph in defense of a book-based culture in recent years (27).

It would be unfair to suggest that any of the authorities quoted are, in any sense, Luddites or machine-breakers or that the attitudes they have adopted should be interpreted as indicative of reactionary or recidivist rejections of the computer as what has been called the "defining technology" of our age. Rather their concerns may be positively interpreted as a serious, if troubled, attempt to come to terms with Professor Bolter's premise, in his book Turing's Man. Western Culture in the computer Age, that technology is as much a part of classical and Western culture as philosophy and science and that these "high" and "lowly" expressions of culture are closely related (28). Nevertheless, while acknowledging the force of the arguments they have used, it may not be too fanciful to discern behind the rationale of the arguments some evidence of a guilty conscience, a realization that librarians themselves, or at least their predecessors in traditional curatorial or custodial roles in the great research libraries, must to some extent bear the blame for the crisis they are currently facing - through having ignored or neglected their conservation responsibilities in the past, by insisting that the education and training of young professional librarians should include so many other time-consuming, often "fashionable" or even "faddish" elements and by their understandable desire to accommodate the newer technologies as these became available. The air, in other words, may be resounding to the noise of numerous chickens coming home to roost; librarians, that is, are beginning to realize that while they enjoyed the period of collection expansion and technological advances in the sixties and early seventies many of them overlooked to a great extent the long-term implications of expansionist collection development policies and perhaps devoted, too willingly and too eagerly, too great a proportion of their budgets to the implementation and development of computer-based systems, succumbing too easily to what McGarry called the Siren songs of information, information technology and, more recently, "information management".

It might also be argued, with Professor Bolter, who is concerned to a great extent with the relationship of the humanities and the computer, that computer-based technology might well be seen as the culture of the late twentieth century and that by continuing to stress the historical and, as it were, "high culture" context of their concerns the apologists of increased conservation and preservation awareness and activity are in a sense simply defying the historical process which they otherwise confess to respect.

I may be instructive in this context to consider the responses of the library schools to the sometimes strident exhortations to change their ways to which they have become accustomed over the past few years. In October, 1984 The Library Association invited all library schools to send representatives to a seminar in London to hear papers from a number of eminent librarians and library school teachers, including some of those I have already quoted, and from Madame Dureau of the Ecole Supérieure des Bibliothèques in France, on various aspects of education and training for conservation. It was, perhaps, symptomatic of the attitudes of the library schools at that time that not all library schools felt it either necessary or possible to accept the invitation. Those who did attend were left in no doubt of the need to encourage changes in their programmes though there was far from universal agreement with the view expressed at the meeting that conservation awareness might only be successfully achieved if library schools recognized that it would come about only by returning librarianship to the curatorial role previously emphasized. Library schools were criticized for becoming too involved with "fashionable" subjects such as management, information technology and computers. The published resumé of the meeting suggests a far greater degree of accord between the library schools and the conservation lobby than, in my recollection, was actually achieved, at the meeting or since (29).

Just before this meeting The Library Association Sub-Committee on Conservation had called for public debate on the preparation of an "ideal" syllabus for a course in library conservation management for the guidance of library schools. It also deplored the fact that the Library Association in its recently approved and promulgated Code of Conduct for its members had made no reference to the librarian's duty to preserve recorded information for the benefit of posterity and future generations (30). It was with the call for an "ideal" curriculum that the differences of opinion and conflicts of interest between the library schools and the practitioners really became obvious. There was no serious difference of opinion about the advisability of ensuring that library school students and library staff should be made more aware of conservation and preservation matters and, indeed, most library schools did and still do ensure that these are covered in their curricula, more often than not, admittedly, in diffused form, throughout courses on collection management and so on. The real difficulties centred around, firstly, what should be included in the "ideal" curriculum and secondly, how, if at all, such a curriculum could be adapted and integrated into courses already offered in library schools for it was clear that library schools already felt that they were being expected to do too much anyway. The draft outlines of a course, published by Dr. Clements of the National Preservation Office, caused considerable outcry, partly because the author seemed to be castigating library schools for their inertia when it came to revising syllabuses but principally because the syllabus suggested was so all-embracing and potentially demanding on the already restricted timetable of the library schools that many found it difficult to take seriously (31). Dr. New of the Polytechnic of North London School of Librarianship stated that the accusation of inertia in the library schools was "...like so much else in the article...so divorced from the facts as to be an impertinence. It is most disturbing to find our national library and our professional association so out of touch with reality"(32). Dr. Clements's draft curriculum outline covered the history of books and printing, preservation of library and archives materials, the technology of structure of records materials, protection and care of materials, administration of preservation programmes, conservation treatment for preservation administrators, photo reproduction of library materials, management of archive and manuscript collections, videos/films on preservation and field-work; it would, in his opinion, have required at least one hour for each topic listed. In Dr. New's estimation, it would have permitted about ten minutes for the history of books and printing from Gutenberg to the most recent innovations in newspaper production in the United Kingdom. Dr. New was speaking for many of his colleagues in the library schools when he questioned whether the library schools could ever again accord such courses a central or core role in the curriculum in face of the many concurrent and often conflicting demands on the curriculum and appealed for a period of consolidation rather than continuous curriculum revision. Following the correspondence in the Library Association Record Dr. John Feather, of Loughborough University of Technology, published a well-structured, detailed and perhaps more realistic curriculum outline and the subsequent correspondence assumed a more aimiable tone (33).

The sentiments expressed by Dr. New are, of course, familiar to everyone involved in education and were in fact points taken up in the McGarry paper on curriculum planning and conservation already referred to. In addition to the views of eminent practitioners the library schools, as he pointed out, have to take into account current and future market forces influencing the job markets for their students, assuming, that is, that market forces are a useful indicator of need. As Dr. New had also pointed out, however important the issue of conservation may be it has to be recognized that many librarians and information workers spend their entire careers in contexts in which preservation is not of significance. To which one might add that as far as market forces and job opportunities are concerned there is a widely though not universally held view that the only apparently growing market for the graduates of library schools will be in those sectors of information management and dissemination where currency, relevance and comprehensiveness of information, not to mention the economic value of the information, will be the determinant factors rather than the actual physical medium or context in which the information is either stored or disseminated. The library schools have already become engaged in a wide-ranging re-examination of their objectives and activities in the attempt to define the distinctive contribution which they can make compared with the many other information-related and information technology-oriented courses currently on offer elsewhere in the education sector. With the development of these other courses the library schools, as Dr. McGarry insisted, may threaten their own future if they are seen by those responsible for their funding to be regressing to the old humanist ideals implicit in the arguments used by the conservationist lobby. One of the dilemmas faced by the library schools is that while it is precisely those cultural values implied by an emphasis on the care and maintenance of books and other records that distinguish librarians and those who educate them from others engaged in the management of information they cannot afford to ignore prevailing government and establishment emphasis on information and the related technology.

There is, too, in the United Kingdom as elsewhere, a growing realization, most noticeably amongst the younger generation of chief librarians in universities and polytechnics, that the library, previously thought of in metaphorical terms as the "backbone" or the "heart" of the university or as the "laboratory" of the humanities", is increasingly having to adapt to a new role as a node in a series of inter-related and inter-connected local and wide area networks and as simply one of a number of information-processing units within its parent institution and as a "gateway" ro remote online database and databank services. There is increasing discussion of the library as a "facilitator" or "enabler" rather than as a responsibly or depository, of the librarian as an integral member of research teams rather than as the collector and organizer of materials, of the research library's having to tailor its acquisitions and services much more closely to the requirements of revenue-earning or profit-making research activities within the university environment. In public libraries, on the other hand, increasing involvement in the arts, in community activities, in the provision of information support services to public and voluntary agencies suggest a developing need for very different professional qualities and qualifications, to the point where an increasing number of public librarians are beginning to question the relevance of anything currently taught in library schools to the perceived and anticipated needs of public librarians in the near future. Though the conservation and preservation needs of public libraries may often be of the same magnitude as those of other libraries (and in Dr. Ratcliffe's survey 15 % of public libraries said they intended to keep everything they acquired) there is much less expressed concern and interest in the conservation debate, partly, one suspects because many public librarians have interpreted it as a symptom of a continuing educational emphasis on "high" as opposed to "popular" culture and partly because public librarians are increasingly have to deal with users suffering much graeter and more harrowing social traumas than those associated with deteriorating library materials.

Undoubtedly the most vocal and articulate case for curriculum change in favour of the restoration of "book-culture"-related syllabuses has come from the large, rich research libraries whose collections of traditional materials are most at risk and specifically from those staff most concerned with humanistic or humanities-oriented research and scholarship and therefore, by implication, with what is popularly seen as having less and less relevance to current social, economic, political and cultural circumstances. By somewhat exaggerating the confrontation and dialectical aspects of the conservation issue this paper has tried to draw attention to an important professional debate on the role and functions of academic and research libraries in the Information Age and, more generally, on the role of the library in terms of inherited cultural value structures. No attempt has been made to define "culture" either for the sake of this paper or as it appears to be understood by some of the protagonists in the debate described. It is, nevertheless, clear, that the crisis in conservation, or conservation in crisis, has accentuated misgivings and doubts that have persisted, however well disguised, since libraries began to exploit the potential of computer-based systems. It is, however, possible to conclude on a more optimistic, or at least, constructive and positive note than might otherwise be suggested by the obvious differences between those trying to save books and manuscripts from physical destruction and those charged with preparing professional staff for the libraries of the future, or whatever kind of institutions and services might replace libraries in the future.

The initiatives taken by the British Library and the Library Association have greatly heightened general awareness of the conservation and preservation problem facing libraries. In particular, the activities of the National Preservation Office in the British Library have been extremely helpful in establishing priorities; by publishing Library Conservation News, organizing a series of seminars, producing informative and advisory bookmarks and posters and advising on and assisting in basic in-house awareness training as well as offering some work experience to library school students, the Office has ensured that few professional librarians can now be in any doubt as to the seriousness of the conservation problem. It is possible that the developing use of the most modern technological means of repairing, conserving and preserving materials, the application of digital imaging technology for the recording of rare and fragile materials on the one hand and, on the other, the increasing deployment of computers in humanities research, (and even a glance at the periodical literature or at the activities recorded in and discussed online on the Humanities Bulletin in the United Kingdom will show how much is being done (34)), will also help to diminish the sense of cultural despair that sometimes seems to pervade the debate on conservation and may, in due course, provide the most effective way of ensuring that conservation, and the cultural context in which it has tended to be approached, will again find an appropriate place in the library school curriculum.

It has to be said, however, that while the library schools have acknowledged the gravity of the situation and have moved some way towards trying to instruct their students in aspects of conservation and preservation there has been no overall acceptance of the view that these should be restored to a central and pivotal place in the curriculum. The Transbinary Committee, which investigated library schools in the United Kingdom in 1985 and made a number of suggestions about curriculum change, scarcely mentioned conservation in its report, emphasizing instead the need for more and better management teaching and the inculcation of information technology skills and greater awareness of the economics of information (35). Once again, the library schools are receiving conflicting, sometimes mutually contradictory advice from the practitioners and the theorists and are being asked to reconcile the irreconcilable.

It seems appropriate to conclude by referring again to Professor Bolter, a classicist with a degree in computer studies incidentally, and to a passage from his conclusions, which seems to present a possibly optimistic but surely desirable outcome. Arguing for the application of computer technology to the production of a vast twentieth-century equivalent of Diderot's *Encyclopédie*, which would represent the same marriage of humanism and technology as its eighteenth-century predecessor, he writes:

> Eventually, vast amounts of literature and history could be made available to the user - to study one area intensely, to search by many authors, genres or periods for passages appropriate to his subject, or simple to browse. The browsing would be motivated by the same disinterested curiosity that is now possible in a library, but the electronic medium would open up new ways to look, suggest new questions, and make at least some new answers possible. For the technique by which the computer organizes knowledge... would make a data base of humanistic literature very different from a library. It would allow the reader to treat written knowledge as a vast workspace in which to build his own interpretive structures. Something would indeed be lost by this transfer to a new medium: the impressive sense of permanence that printed

> books and massive library buildings convey. The fixity of the text and the glory of lasting literary monument would be diminished. In their place would be the qualities of the computer age, namely, the sense that recorded knowledge can be collected, transmitted, reorganized, and molded to one's immediate needs and the feeling of being immediately "in touch with" our culture's past. The technologist might find the past more accessible in this form, and the humanist might find new uses and new interpretations for familiar texts and historical events (35).

Though the irony of Professor Bolter's allusion to the fixity and permanence of the text should not be lost on us it is an attractive picture. Perhaps, though this conference may be primarily concerned with equally vexing problems arising from the technology, this grander perspective may be borne in mind and it will not be forgotten that, while we may be dealing in and with the defining culture of our age, there is another culture or at least a concurrent culture that still looks to us for the solution of many of its problems. If the right solutions are found, the Rilkean angel may be, not the potentially dangerous or destructive and scornful one but the angel that stands on the threshold announcing a bright new age. Some may not, in Rilke's words later in the same Elegy, feel "very much at home in the interpreted world" promised by information technology but at least there might still be texts available in that world for them to interpret.

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EUROPEAN LIBRARY COOPERATION - AN EC STANDPOINT

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EUROPEAN LIBRARY COOPERATION - AN EC STANDPOINT

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Abstract

The cause and context of the attention now paid by the European Commission to library cooperation issues will be outlined and the results of the work carried out in the last 18 months will be briefly commented on and assessed. Some conclusions will be drawn from the Hearing on libraries in the EC held in February 1987 in Luxembourg. On the basis of both the Hearing and knowledge of the situation of libraries (especially with respect to the use of new technologies) gathered to date, some ideas will be developed on how library cooperation could be furthered at Community level and the kind of rôle the Commission could realistically play in this process through a dedicated plan of action.

EUROPEAN LIBRARY COOPERATION - AN EC STANDPOINT

This is the first time that I have the opportunity of attending this seminar of international repute. Because this year's seminar is also in honour of Professor Pflug - who has always been dedicated to international cooperation - it seems to me a fitting occasion to present our first ideas on the form a special EC action in favour of libraries could take. In this way I hope to use this forum to initiate a discussion which - hopefully - will amplify in the next months and eventually lead to concrete action.

At the risk of being parochial, I have to recall some of the background which has led us to this point in order to be able to explain our reasoning (1) .

For about two decades the European Commission has been directly concerned with information systems. Since 1975, it has implemented a series of action plans and programmes aimed at scientific and technical information, then broadened to specialized information and now to the concept of an information services market in the EC. For probably very good reasons, it has never addressed directly, until recently, the problems of libraries per se.

There have been a number of events since 1984 which have focussed the Commission's attention on the library world, and more specifically on the means to promote library cooperation. The most important of these events has been the Resolution of the Ministers of Culture of the EC of 27 September 1985 - precisely because it provides the legal basis (and, of course, also the stimulus) for developing an action at Community level dedicated to libraries.

You may well ask, as practical people, why it has taken two years to develop a concept for such an action especially as the Resolution itself is fairly explicit on the orientation it should take. I believe there are two fundamental reasons for this. In the first place any international action, and there fore all the more so an action at Community level, needs to be founded on consensus and political will. Since consensus building is a long and slow process (as I am sure you are all aware), in particular in as diverse, complex and variegated a field as libraries, we had to define an initial strategy which would prepare the terrain and contribute really to this process, at the risk of generating impatience in some people. In fact, the Resolution itself has given us the lead since it explicitly calls on the libraries themselves in the Member States to increase their cooperation and only requests the Commission to help them do so. I am sure that this consensus building period is far from over and that it will take quite a few more months - not to say at least a year - before our plan of action is fully accepted!

In the second place, we interpreted the Resolution rather literally. We decided that prior to making concrete proposals, a preparatory phase was needed during which we would study the situation of libraries in some detail and have the opportunity to consult formally and informally with as many of the parties concerned as possible. During this phase we also wished to acquire a better understanding of the problems faced by libraries - and in particular those connected with the introduction of the new information technologies - as we had realized that in fact we had little know-how on the subject.

This preparatory phase has been mainly given over to examining a whole range of issues, developing ideas, having a series of fact-finding studies carried out. We have talked to people in the Member States of the Community in order to understand better the organization, situation and national plans for libraries. We also contacted relevant international organizations, attended international and national professional events (such as this one) - and generally attempted to make ourselves known. Finally, we organized a more formal consultation last February - which was the Hearing on Libraries in the EC.

This preparatory phase is more or less terminated and we are now gearing up to enter the next phase - which is that of presenting our proposals to the Member States: that is, to the relevant authorities as well as to the professionals.

Being "juge et partie" it is difficult for me to assess with complete objectivity the past 18 months or so. I, of course, believe that there has been some useful work done and that some progress has been made.

There appear to me to be some objective markers which confirm this point of view:

In the first place, most of the studies we had carried out broke new ground in one way or other - in particular those of the LIB-2 series. But this applies also to those on library economics/macrostatistics and on preservation/conservation and the use of new technologies. They broke new ground largely because they provided the opportunity for an overview - at national and/or at Community level - which had not existed before. This is also the main reason why we have incurred delays and why the publications we are preparing have not yet come out.

In the second place, there was a remarkable and even surprising degree of unanimity in the overall reactions of the participants of the Hearing to the questions we put to them. I can only assume that not only did we ask the right questions, but also that there is more common ground to talk of European (and in particular Community) cooperation today than there was, say 3-4 years ago. Dr. Pflug's paper at the IFLA conference in Brighton is certainly another positive sign in this direction.

On the other hand, there are a number of other things which we would have liked to do, problems to explore in more detail, discussions and dialogues to initiate etc. - which for lack of time and resources (including human ones) we have not yet be able to do. For instance, we have barely scratched the surface of the technical aspects/issues/standards involved in the interconnection of library system (the work we had subsumed under the code name of LIB-3). But, hopefully, this will be remedied in the next months - starting with the work PICA and Mrs. Holm are doing for us, I will be getting some additional support in this rather esoteric area and we plan to organize a technical workshop next year.

On the whole, I think that we have achieved some of the basic objectives we had set ourselves for the preparatory phase: we have collected sufficient facts to be convinced now that there is really a great deal that can and needs to be done to help our Community libraries respond to the challenges of the information society (and benefit from international dimension the new technologies enable). We have also been convinced that the Commission has a real role to play in this process. Neither aspects were obvious to us at the start. In addition, I think we have started generating (though perhaps still in a small and focussed way) some momentum which can contribute to developments, and perhaps even to change.

This being said, the difficult part remains - which is how to define a Community action which can be really effective and achieve the most, realistically; an action which is economically justifiable, will satisfy many (if not all), be acceptable to both political authorities and to the professionals; an action that can generate the greatest progress without wasting resources; in short, an action which would provide the best framework to catalyse change.

I don't believe that there can exist a magic formula and that all we need to do is to sit back and wait until it happens: the Commission, expecting to be told exactly where and how to invest its effort; the librarians expecting to be imposed exactly what is to be done. I believe that there needs to be a dialogue. I would even go one further - the formula should be that the Commission provide a framework through which the initiatives out there can be channelled. The onus then is on both; on the Commission: to provide the best possible and most hospitable framework; on the libraries and related organizations: to have the necessary initiative. This, I think, is one of the implicit conclusions that can be drawn from the Hearing which we organized last February and which I mentioned earlier.

The conclusions that can be drawn from the Hearing (2) are rather significant because they are a clear indication of what the Commission's action should achieve. They define, in a sense, a guiding philosophy. The Hearing did confirm some priority areas where actions should take place and there were many constructive suggestions which appeared to obtain general support. Nevertheless, particularly in the session which grouped questions on general approach (but throughout the other sessions, too) the participants did not make what probably would have been simplistic choices. Instead, they formulated strongly - I would say unanimously - what the main criteria should be which should determine any choice. The message was clear:

- The approach should be pragmatic and realistic and there should be in-built flexibility in any proposed action programme - including in time-scales.
- The actions should be such as to have visible results in the shorter term (as well as in the longer term) and to have a multiplier effect at national level. This was more important than the dimension of the actions themselves.
- The scope of the actions should not be limited arbitrarily but their choice should be problem-driven and they should build on existing achievements. National priorities should be respected.
- Neither theory nor practice should be neglected; in other words, although the importance of international standards and rules of practice were stressed, there should also be pilot experiments and demonstration projects.
- The Community action should be formulated in such a way as to incite a self-selecting process - that is, as to which libraries would be in the front lines to

benefit from such an action. I interpret this to mean that we must promote initiative amongst libraries and related organizations themselves.

- It was recognized that, as there were both cultural and economic benefits to be had from such an action, the economic factors - the economic justifications for actions - should not be neglected either.
- It was recommended that a Community programme should be open to third countries.

This gives us a very full agenda and at the same time implies that, providing these criteria are adhered to, any action in fact would be a useful action!

These criteria have been our starting point in the formulation of our first ideas on the kind of framework a Community plan of action should provide. A document is in preparation, which I hope will be soon able to be distributed widely in order to provoke discussion and continue the dialogue initiated at the Hearing.

To make the logic of our reasoning clearer, I shall start with the way we have understood the objectives.

The Council Resolution itself prescribes the overall aims or general orientation to be followed - i.e. to improve access to the holdings of libraries across Europe through:

. proper application of the new technologies;
. increased cost-effective cooperative efforts at Community level;
. greater harmonization of initiatives already taken or to be taken by libraries bodies.

We have interpreted this to mean both: improve library services in the interest of the users and optimize the use of library resources in order to be able to provide these services.

We have thus identified four principal objectives:

- to promote the availability and accessibility of modern library services throughout the Community, whilst taking into account existing geographic discrepancies - i. e. taking explicitly into account the different levels of development between the so-called Northern and Southern countries, and therefore the different needs;
- to promote a more rapid but orderly penetration of new technologies in libraries in a cost-effective way;
- to promote standardization - i.e. their application or development as the need may be;

- to promote the harmonization and convergence of national policies for libraries - i.e. the retroactive effect which Community actions often have.

Notwithstanding some general considerations and the wide range of problems that we know need to be addressed, these four principal objectives have been translated into specific aims - or areas where we believe progress needs to be made. Quite by accident there are four of these, too!

- the availability of what we consider the basic resource - i.e. catalogues in machine-readable form (e.g. national bibliographies, union catalogues, etc.);
- the ability to interconnect automated library systems and thereby their improved accessibility;
- better access to documents held in libraries and better means of locating holdings;
- modernization of the skills of library workers.

As to the proposed Plan of Action itself, basically we have opted for a modular, non-subject oriented approach, in order to have the best chance of attaining these general and specific objectives, be able to satisfy the criteria formulated at the Hearing, and in general be as flexible and as hospitable as possible to all types of projects.

In effect, we are proposing a framework structured in five action lines with a time-scale of five years for the whole programme. All five are of equal priority. Each action line is designed to achieve progress in one or more of the identified areas and promote directly or indirectly all the main objectives. Each one has also its own more precise objectives and specifies a particular formula for a reasonable level of funding of projects in each category (and various other criteria). Each also specifies which organizations should be eligible to participate. We have tried to organize them in such a way that the emphasis is modulated - so that the differing needs of the different countries and of the different types of libraries and their users can be covered. The idea is that each should be able to find a little for his own. This applies also to the repartition in the funding between the action lines and to the formula for shared funding (the Commission would only pay a certain percentage of the costs of each project).

You may be disappointed that we have tried very hard to avoid a subject-oriented approach. We have done this precisely in order to allow for a broad subject scope and to leave the specific initiatives in your camp - and of course in that of the national authorities. I would much like to say that this approach is innovative to "action planning". In reality, I believe it probably reflects a general tendency which is also manifesting itself in other fields!

Now to the action lines themselves:

The first Action Line is designed to encourage the creation of, or enhancement to machine-readable catalogues - in fact principally national bibliographies. As we think these should be national projects, a country can choose to concentrate rather on its national union catalogue if that is its priority. The main idea here is to give the impetus for creating computerized national bibliographies in those countries which do not have one, or which have had to interrupt the production - mainly the southern countries. At the same time the opportunity would be given to the others,who have one, to improve it in one way or another. In addition, some funding would be earmarked for smaller recon projects, for collections of international interest. The Community funding would vary from 10% to 70% depending on the type of project and other criteria.

The second Action Line is intended to stimulate the inter connection of several systems across borders - i.e. networking. Here we think that there will be fewer but larger pilot projects and that the first beneficiaries will inevitably be consortia of those organizations, cooperatives or whatever who are already more advanced and more stable technically, more ready to take the plunge, so to speak, to act as demonstrators. The purpose of the interconnections would need to be specified in the project proposals - e.g. ILL, exchange of MARC records, distributed databases, access to OPACS, or whatever else. It should also provide the opportunity to develop and test out the technologies and corresponding standards (for instance, we cite OSI explicitly)as well as standard agreements between partners. I think there will be a need to encourage a very careful preparation of the projects to be proposed and also the involvement of other parties, such as commercial hardware/software suppliers, operators of value added networks, etc. We think of proposing a Community funding of up to 50% of finite costs.

With the third Action Line we wish to stimulate the development of all sorts of new library services with the proviso that they are based on the use of new technologies - and especially, we want to give the opportunity for libraries to demonstrate and to create demand for innovative services. Here we would propose to fund a host of smaller projects over a specified period of time and to about 80% of their costs (with a ceiling naturally). We would specify selection criteria - and some countries may wish to set up a national filtering mechanism. What is to be considered an innovative service will naturally depend on the situation of libraries in each country. Potentially all kinds of libraries could be candidates here and we would expect to create a real multiplier effect through the example set by such pilot services.

The fourth Action Line is designed to encourage the production of library-specific commercially viable products, tools, services, etc. It is thus more oriented to encouraging the private sector to serve the specific needs of the library world. We would proceed here as we have in the past for the specialized information sector - i.e. with calls for proposals and a Community funding of about 25%. There are a host of useful things which could be supported here - e.g. library specific management information systems, software tools for multilingual authority lists, CD-ROMs for libraries, course ware, etc.

The fifth Action Line is given over to dissemination of know-how and stimulating exchanges - i.e. studies, research, workshops and other meetings, staff exchanges, etc. Under research one could foresee general ground-clearing studies (e.g. on professional training) and studies to support specific areas (e.g. feasibility studies for various types of projects, preparatory work on standards, etc.). Under meetings and workshops, one could foresee events aimed at disseminating knowledge (e.g. the results of projects and studies) and meetings of expert panels to evaluate projects. Some funds would also be earmarked for study trips and exchanges of professional staff. Community funding of activities here would be at 100%.

I will be very brief on the way the Plan of Action could be implemented and managed because I would rather open the dialogue on the contents - i.e. on the flexibility and appropriateness of the action lines - rather than on this aspect, which it is probably premature to discuss. In short, we would see the setting up of an Advisory Committee of national delegates, as is generally the practice, and the use of expert panels to evaluate proposals and results technically (as done in ESPRIT). We would apply mechanisms such as publishing calls for proposals, complemented by quite a lot of PR (through regional workshops, meetings in the Member States, etc.) to generate good quality projects.

Before opening the debate on the ideas I have just exposed, I would like to make a few general comments:

Firstly - these are very much our first ideas and we welcome all discussion on them because we consider consensus is absolutely essential if anything is to come out of it. As I said earlier, the real initiative is really out there with you. The Commission's role can only be that of a catalyst - providing the framework through which to channel this initiative.

Secondly - the Commission must concentrate inevitably on the so-called "international cooperation aspects" and all that can facilitate them - without either prejudicing or privileging any of the Member States. So we have to seek for the right balance.

Thirdly - third countries should not be forgotten. Obviously ways will need to be found to enable other non-Community European countries to participate in the actions, should they express their interest to do so - for instance, in projects under Action Line II (networking).

Fourthly - I am aware of a fundamental weakness in our proposal which you may or may not agree with: it may be far too complex and probably attempts to achieve too much. The message may not be assimilatable either by the politicians or by the interested parties themselves - i.e. the professionals. Yet I am convinced that all the action lines are essential and complementary to each other, if we are to attain the goals we have set and influence national policies - and if we agree to do so in the way recommended at the Hearing, i.e. with: pragmatism and realism, urgency and visibility, flexibility; with spin-offs and multiplier effects at national level, cost-effectiveness, and by building on achievements - all in all, if we are to provide a solid substratum for European Library Cooperation.

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(1) Iljon A.: The Activities of the European Communities in the field of libraries. (For the LIBER Annual General Meeting, 1-4 July 1987, Zurich)

(2) Hearing on Libraries in the European Community, Luxembourg, 11-12 February 1987, Report (7 April 1987)

LIBRARY COOPERATION WITHIN THE LIGUE DES BIBLIOTHEQUES EUROPEENNES DE RECHERCHE (LIBER)

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LIBRARY COOPERATION WITHIN THE LIGUE DES BIBLIOTHEQUES EUROPEENNES DE RECHERCHE (LIBER)

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Abstract

LIBER is a non-governmental association of European research libraries. It was founded in 1971 under the auspices of the Council of Europe and has obtained the consultative status with the Council of Europe. Today 170 important libraries are members in the following countries: Austria, Belgium, Cyprus, Denmark, Finland, France, Federal Republic of Germany, Greece, The Holy See, Iceland, Ireland, Italy, Luxembourg, Malta, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, and the United Kingdom.

LIBER organizes conferences within the Annual General Meeting and seminars of Working Groups. Working Groups focus on:
Library Management, Library Automation, Library Architecture, Manuscripts and Rare Books, Map Collections.
Subjects dealt with in conferences or seminars were, among others, Legal Deposit Laws, Management Implications of Library Automation, Air Conditioning in Library Buildings, Far Eastern Collections in European Libraries, Conspectus Method and Acquisition Policy, Copyright of Manuscripts, Map Collections Management. The results have been published in the LIBER Bulletin (until now 29 volumes have appeared).

Besides the Council of Europe, LIBER closely cooperates with other library-related institutions and organizations, e.g. the Commission of the European Communities, the European Foundation of Library Cooperation, Library Associations etc.

LIBER is running some major projects concerning
- European Register of Microform Masters
  A feasibility study aims at answers to the following questions:

standards observed in production and storage, figures of annual increase, state of bibliographic control, state of retrospective conversion of catalogues containing microform masters of historic material, possibilities of linking the project of national programmes, direct ordering, updating etc.
The project is prepared by LIBER in cooperation with the British Library. Cooperation with the Commission of the European Communities is intended.

- Directory of Library Network in European Countries
This project aims at correct, comprehensive and updatable information concerning the networks' facilities and activities. This project is directed by the Library Automation Group in cooperation with the Centre for Catalogue Research (Bath), PICA (The Hague), Hochschulbibliothekszentrum Köln, and others.

- European Conspectus
LIBER is going to act as a coordinating agency concerning the activities to extend the British Library Conspectus to a European one and to base it on network facilities.

LIBRARY COOPERATION WITHIN THE LIGUE DES BIBLIOTHEQUES EUROPEENNES DE RECHERCHE (LIBER)

1. GENERAL REMARKS

LIBER is a non-governmental association of European research libraries. It was founded in 1971 under the auspices of the Council of Europe, and has obtained the consultative status with the Council of Europe (1). Today 170 important libraries are members in the following countries: Austria, Belgium, Cyprus, Denmark, Finland, France, Federal Republic of Germany, Greece, The Holy See, Iceland, Ireland, Italy, Luxembourg, Malta, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, and the United Kingdom. The number of members and interested countries is increasing. E.g., Yugoslavia has recently joined the Council for Cultural Cooperation of the Council of Europe, and will therefore, in future, take part in the work of LIBER. There is also some cooperation with libraries in Eastern Europe via the Working Groups, e.g. the Working Group on Map Collections.

Members of LIBER are national and university libraries, but also a reasonable number of special research libraries. At the present, LIBER is going to have also close cooperation with companies engaged in the field of librarianship and information.

LIBER organizes conferences within the Annual General Meeting and seminars of Working Groups. Working Groups focus on:

- Library Management
- Library Automation
- Library Architecture
- Manuscripts and Rare Books
- Map Collections
- Staff Exchange, and other subject fields.

Subjects dealt with in conferences or seminars were, among other,

- Legal Deposit Laws
- Management Implications of Library Automation
- Air Conditioning in Library Buildings
- Far Eastern Collections in European Libraries
- Conspectus Method and Acquisition Policy
- Copyright of Manuscripts
- Map Collections Management.

The results have been published in the LIBER Bulletin (until now 30 volumes have appeared). It is discussed to publish future volumes as monographs with subject titles. Current information is spread in the LIBER News Sheet.

Besides the Council of Europe, LIBER closely cooperates with other library-related institutions and organizations, e.g. the Commission of the European Communities, The European Foundation of Library Cooperation, library associations etc.

At present, the Executive Committee consists of the following librarians: Franz Kroller (President, University Library of Graz, Austria), Thomas Tottie (Vice-President, University Library of Uppsala, Sweden), Jakob van Heijst (Treasurer, Royal Library The Hague, The Netherlands), Jean-Claude Garreta (Bibliothèque de l'Arsenal, Paris, France), Roland Mathys (Central Library, Zürich, Switzerland), Brenda Moon (University Library of Edinburgh, UK), Heiner Schnelling (University Library of Konstanz, FRG), and the author who is secretary.

2. RUNNING PROJECTS

LIBER is running some major projects concerning a European Register of Microforms, a Directory of Library Networks in European Countries, and a European Conspectus Policy.

2.1 European Register of Microform Masters

In 1985, LIBER decided to launch a Register of Microform Masters held by European research libraries (2). In 1986, a survey was undertaken among LIBER libraries to introduce the project idea and obtain data necessary to assess its feasibility. The results were presented at the 1986 Annual General Meeting of LIBER in Heidelberg (3). With financial support from the Council of Europe, a preparatory meeting on the Register of Microform Masters took place in Luxembourg in May 1987. The main result of this meeting was the decision to prepare a draft version of the project in order to outline the framework for a detailed feasibility study on the project. In the meantime, this draft version has been worked out by Dr. Heiner Schnelling (University Library of Konstanz, FRG) and Dr. David Clements (British Library/Preservation Office). The following short report is based on their paper still unpublished because the full version is directed to the responsible European organizations, as the Council of Europe and the Commission of the European Communities.

With respect to the fact that those collections that are deteriorating and becoming embrittled are converted to microforms in order to retain the information contained within these collections the essential objective of the project must be the development of a Register of Microform Masters to record those books, periodicals, newspapers, etc. that have been filmed in order to provide a listing so as to avoid duplication of effort. The European Register must take into account the computerized Register based on a UK MARC that has already been established in the British Library and the existing Microform Masters produced by the Research Libraries Group in the United States as well as developments at the Bibliothèque Nationale in France and at the National Libraries in Italy.

In 1986 questionnaires were sent out to LIBER libraries to gather information on the subject. One of the results is that the stock of microform masters held by the National and State Libraries in Austria, England, Finland, France, Italy, Netherlands, Switzerland, Wales, and West Germany amounts to some 410.000 titles with an annual increase of about 10 pc. Several libraries made 150.000 to 200.000 duplicates a year. National standards are observed for microform production. Most collections of microform masters reported in the survey consist of newspapers and manuscripts. Most of the libraries surveyed expressed their interest to cooperate in some form of a European Register of Microform Masters.

With respect to this scope the Register should record master negatives and their location for a wide range of material including monographs, theses, periodicals, newspapers, manuscripts, etc. It should include material produced commercially. Data of publication of material should not impose limitations as large quantities of material published since 1900 are embrittled and must be replaced.

The microforms should be limited to 35 mm film or microfiche meeting national or ISO standards.

With respect to the cataloguing requirements the records must be converted to a machine readable format with a MARC compatible structure. But a variety of cataloguing standards must be accepted.

Output should be done on COM-fiche and/or as online files.

It is a major point that there is not only access to information on what is available and where but also a guarantee that copies will be provided when requested.

It is necessary to cooperate with other registers, e.g. in North America.

In addition, to make progress, the detailed feasibility study should collect further statistics, consider the principle options (offline or online, distributed or centralized databases etc.) and estimate the costs and benefits.

LIBER is going to apply for this feasibility study at the mentioned European organizations, especially the Commission of the European Communities, that placed the idea of a European Register of Microform Masters at the top of the recent library programme.

2.2 Directory of Library Networks and Network Facilities in European Countries

The Working Group on Library Automation is preparing a Directory of Library Networks and Network Facilities in European Countries which is to be published in the near future (4). The work is done by the following members: A.Bossers (PICA, The Hague), Ph. Bryant (Centre for Catalogue Research, Bath), Mrs. A. Lamvik (Norges Tekniske Universitetsbibliotek, Trondheim), P. Rau (Hochschulbibliothekszentrum, Cologne; Chairman), Mrs. S. Reinitzer (University Library of Graz).

The first approach was based on a list of addresses prepared by K.W. Neubauer for his planned network publication. His list was revised and enlarged.

The Directory is needed soon and it must be updated at reasonable intervals, so the aim should be to publish it quickly rather than to make it perfect. The Directory will also include plans under development, presented as brief information in an appendix.

The Directory is based on a questionnaire and will present entries for the following networks and network facilities:

AUSTRIA
BIBOS - Bibliotheks-Organisations-System
Elektronische Datenverarbeitungsgesellschaft m.b.H.
Wien

Österreichische Zeitschriftendatenbank (ÖZDB)
Österreichische Nationalbibliothek
Wien

BELGIUM
DOBIS/LIBIS NETWORK
University Library, Katholieke Universiteit
Leuven

DENMARK
ALIS - The Online Literature Localization and Document Ordering Network System of the Scandinavian Central Libraries of Technology
Denmarks Tekniske Bibliotek
Lyngby

FINLAND
MINTTU
Automation Unit of Finnish Research Libraries
Helsinki

FRANCE

Ministère de L'Education Nationale
Direction des Bibliothèques et des Musées de L'Information Scientifique et Technique
(DBMIST)
Paris

GERMANY

Der Bayerische Bibliotheksverbund
Generaldirektion der Bayerischen Staatlichen Bibliotheken/
Bayerische Staatsbibliothek
München

BRZN - Bibliotheksrechenzentrum Niedersachsen
Niedersächsische Staats- und Universitätsbibliothek Göttingen
Göttingen

Hamburger Bibliotheksverbund
Staats- und Universitätsbibliothek Hamburg
Hamburg

HBZ - Verbund
Nordrhein-Westfälisches Verbundsystem
Hochschulbibliothekszentrum des Landes Nordrhein-Westfalen
Köln

HEBIS
Hessisches Bibliotheksinformationssystem
Stadt- und Universitätsbibliothek Frankfurt/M.
- Hessischer Zentralkatalog -
Frankfurt am Main

SWB - Verbund
Südwestdeutscher Bibliotheksverbund
Universitätsbibliothek Konstanz
Konstanz

Verbund der obersten Bundesbehörden (VBB)
Bundeshaus
Bonn

Zeitschriftendatenbank (ZDB)
Deutsche Zeitschriftendatenbank
Hrsg.: Deutsches Bibliotheksinstitut/
Staatsbibliothek Preußischer Kulturbesitz, Berlin
Berlin

GREAT BRITAIN
BLAISE
The British Library
Bibliographic Services Division
London

BLCMP
University of Birmingham
Birmingham

LASER - London and South Eastern Library Region
London & South Eastern Library Region
London

OCLC Europe
Birmingham

SCOLCAP - The Scottish Library Network
National Library of Scotland
Edingburgh

SLS
SWALCAP Library Services Ltd.
Bristol

ITALY

The National Library Service Network in Italy
Biblioteca Nazionale Centrale
Firenze

NETHERLAND

PICA - Centrum voor Bibliotheekautomatisering
's-Gravenhage

NORWAY

BIBSYS
The Automated Library System for the Norwegian Universities
Trondheim

UBO: The public EDP Services of the Royal University Library at Oslo
Universitetbiblioteket i Oslo
Oslo

SWEDEN

LIBRIS-Library Information System
Kungl. Biblioteket
The Royal Library - National Library of Sweden
Stockholm

SWITZERLAND

THE SIBIL SYSTEM AND THE REBUS NETWORK
Bibliothèque cantonale et universitaire
Lausanne

APPENDIX

Plans in: Czechoslovakia
Germany (GDR)
Greece
Hungary

Luxembourg
Poland
Portugal
Spain
Yugoslavia

With respect to network plans in further European countries their national libraries have been contacted in order to get respective information.

The Directory will also include information concerning those general research networks which are of interest for libraries, as, e.g. the Deutsche Forschungsnetz (DFN) in the Federal Republic of Germany, and the Joint Academic Network (JANET) in the United Kingdom.

Each entry of the Directory will be of an average length of some five pages. The compilation work is done by the Centre for Catalogue Research at Bath. The Directory is going to be printed with the Nederlands Bibliotheek en Lektuur Centrum.

Each entry is structured according to the following schedule (5):

1. Name
2. Date of establishment
3. Address of the network centre (name of contact person should be added)
4. Membership
   - Types and number of member libraries
     (branch libraries are disregarded, their number may be added in parentheses)
   - Names of member libraries
5. Management structure
   (role of the centre, user groups, administration)
6. Technical organization and equipment
   - Type of processing (online, offline)
   - Type of network telecommunication
   - Technical equipment of members (in general only)
   - Number of terminals connected
   - Hours of operation of the online service
7. Related networks and databases
   (which records are exchanged with)

8. Database structure
   (file structure, redundant/nonredundant, external records maintained)
9. Size of the central database (items, titles)
10. Yearly growth of the central database
11. Estimate of the quantity of stock still to be converted
12. Record handling
    (retrieval, record editing and creation, subject access)
13. Standards
    - Filing rules
    - bibliographic control, authority control
    - Character set
    - Exchange format
    - Communication interfaces
14. Catalogue output
    (catalogue types, physical forms, union catalogue)
15. Customer support
16. Types of costs (which members are charged)
17. Publications about the system

2.3 Retrospective Conversion

The Library Automation Group of LIBER took also into account the matter of retrospective conversion. There are some retroconversion projects going on, most of them in the United Kingdom, but also a few in the Netherlands, Germany, Austria, and Sweden, but they differ as to extent and approach and there is at present little coordination of the projects.

In Europe, British libraries have most experience in this field. So the Library Automation Group dealt in detail with a state-of the art-report of the Centre for Catalogue Research and a case study on the Edinburgh project prepared by Derek G. Law (a publication is expected), and also with a case study by Gijs Jacobs on retrospective conversion in the Royal Library at The Hague.

The Working Group has the opinion that the existing results and experiences should be made know and discussed more deeply at an expert meeting. As the Council of Europe, according to the recommendation (document DECS/RECH (86) 17), that has been approved by the Committee of Ministers in 1987, is also going to promote retrospective conversion activities there will be held such an expert meeting on behalf of the Council of Europe on 25 and 26 February 1988 at Strasbourg.The preparatory work for this meeting will be done by LIBER. Invitations will be sent out by the Council of Europe in order to approach the respective national decision makers.

The Library Automation Group suggests the following theses, besides other, for further discussion of the experts:

1. For retroconversion, a library, normally, will find it helpful to make use of already existing bibliographic data. Checking one or few large databases covering a wide range of the records to be converted is easier and more economical than checking numerous sources.

2. Care should be taken that records which are not hit in a database and therefore must be keyboarded by the library itself, would be stored in a central database: so other libraries could use those records afterwards.

3. Central databases of importance for retroconversion purpose should be linked together to enhance the availability of sources and make operations easier.

4. With a view to some co-ordination of retroconversion at least within one country, and perhaps also in relation to some trans-border data flow, there should be early agreement on a minimum recommended European bibliographic standard to be followed in retroconversion. The standard chosen would depend on the aims of the individual retroconversion project, but sometimes aims seem to be defined differently, or not at all.

5. A similar statement is true of the necessity for defining an exchange format.

6. Regarding the high costs of retroconversion, it may not be reasonable to convert the whole catalogue, but to limit the conversion. Limitation might be possible by concentration on the most frequently used stock, by chronology, by selection of special collections or disciplines. Libraries will give different answers according to their

different stocks, catalogues and organizations.

7. Because of cost restraints it should be sufficient, normally, to do the retroconversion using the catalogue record and not the book in hand, that is provided the catalogue is of a reasonable quality.

2.4 European Conspectus Activities

In cooperation with the British Library LIBER is going to look for possibilities to undertake a European Conspectus as a networked compatible series of on-line accessible records. LIBER is acting as a coordinating agency. For this purpose a special Working Group on Acquisition Problems has been set up in order to outline the project (e.g. to put forward proposals for the network and the linking with RLG, to check up the aims etc.), whereas the Executive Board takes care of the possibilities of funding the project.

Some sentences by J.M. Smethurst are quoted here from his contribution at the Annual General Meeting of LIBER in 1987. With respect to resource sharing he said: The BL looks for "a method for recording the relative strengths of libraries in discrete subject areas. The technique it is promoting nationally to achieve this objective is Conspectus, a method for recording the relative strengths of libraries in discrete subject areas together with a machine based facility for updating and interrogating the data, to reflect and respond to changing circumstances and comments. The technique provides sufficient detail to allow the librarian or reader to understand the scope of a particular collection, or part of a collection, and to appreciate the limitations which the British Library is proposing in its acquisition of a particular subject. As a tool, it has potentiality when used in relation to a network of library catalogues, to allow the user to be selective in his consultation of on-line listings, or it can direct him to the most comprehensive coverage of the subject area of his choice. It can enable librarians to develop strategies for resource sharing based upon up-to-date knowledge of acquisition policies and collection strengths in other libraries and it can make a substantial contribution to effective cooperative collection development and conservation on a regional, national or international basis....

Whilst the British Library wishes to see the technique adopted in England and Wales, in Ireland and in Western Europe, and wishes to offer sound leadership to others, there are a number of questions and problems which need to be resolved, and over which the

British Library wishes to be responsive to the opinion of others. Conspectus will be particularly effective, if accessible on-line through a national database. The British Library will mount its own schedules on-line through the North American RLIN network, and also on BLAISE. A major question that the British Library is now addressing is how should any national network be organized to ensure that it is comprehensive? Notwithstanding the published schedules, any national Conspectus will require a broad validation of individual contributors to ensure consistent, objective standards. (The British Library has contributed to this validation in the Scottish implementation.) This validation will need to be organized and funded, and operate through a national agency. If the British Library takes on this role, it will almost certainly be subject to pressure to mount and maintain a national data-base. Similar considerations apply to the adoption of Conspectus in Europe. Undoubtedly the British Library is in a position to offer a lead here, and a European Conspectus would be of great value to the British Library in defining its collection development in relation to European literature and European holdings" (6).

The project will also get benefits from the experience of the Royal Library at The Hague that started Conspectus cooperation with the British Library.

It seems to the experts that to apply the Conspectus method will not only be useful for acquisition policy, resource sharing, and inter-library lending, but also for decisions concerning the question what holdings to include in retrospective conversion and for the conservation and preservation debate with respect to the decision what holdings to conserve or preserve in what way.

The Executive Committee of LIBER outlined the following terms of reference for the Conspectus Group that is chaired by Mr. H.J. Heaney (University Library of Glasgow):

- to promote the use of Conspectus for resource sharing in the fields of collection development, retrospective conversion, and conservation and preservation
- to map and assess this use

and especially

- to consider the need for translations of existing Conspectus
- to consider the need for European, national, regional, and local adoptions of the schedules and look for their respective compatibility and common standards

- to advise the Executive Committee on the developments of European infrastructural elements (e.g. relating to networking, Conspectus databases)
- to gather and promote information among European research libraries concerning use and development of Conspectus.

3. OUTLOOK

In addition there should be mentioned only some other ideas and projects being discussed respectively dealt with.

In continuation to earlier plans the Working Group on Management is going to device a framework for a European book price index using the database facilities of suppliers and machine readable data from national bibliographies. There is some cooperation with similar projects in the United States.

As already mentioned LIBER is also in contact with companies, especially with respect to the storage possibilities of optical disks. The plans aim at the possibility of using these facilities for conservation and distribution of special collections of, e.g. manuscripts, printed books, and newspapers. LIBER is convinced that there will be a strong need to decide what sort and what part of library holdings can be kept as physical objects and what must be converted to new media in order to either only keep the contents or make available the contents and restore the physical objects from being used and deteriorated.

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THE USE OF NEW INFORMATION TECHNOLOGIES (NITS) IN LIBRARIES IN THE FEDERAL REPUBLIC OF GERMANY

(Results of the Study EEC-LIB2/5)

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Abstract

Present State of Automation

Libraries in the Federal Republic of Germany inc. Berlin (West)

ACADEMIC LIBRARIES

a) Libraries with supra-regional functions

National libraries and central special libraries:

Three libraries share the important functions of national library in the Federal Republic of Germany:

Deutsche Bibliothek, Frankfurt
Staatsbibliothek Preußischer Kulturbesitz, Berlin
Bayerische Staatsbibliothek, München

Beside these there are four central special libraries with supra-regional functions. Six of these seven libraries apply new information technologies, that is a rate of automation of 86% (Chiefly in cataloguing).

b) Libraries with regional functions:

Libraries of the Federal States and academic municipal libraries

29 libraries belong to this group, out of these 10 = 35% have electronic data applications.

An increase up to 50% automation rate is planned for the coming years, with special emphasis on network cataloguing (that means, as participants of an cooperative system).

c) University libraries

54 out of 57 university libraries apply electronic data processing. According to th most recent plans all of them intend cataloguing with support of electronic data processing (the majority in a network) within the next three to five years. In most cases the cataloguing for the current catalogue is stopped from a certain date of publication. There will be a need of retrospective conversion of the old catalogues.

d) College and technical college libraries

147 libraries belong to this category.

Only approx. 4% (six libraries) apply electronic data processing mostly for cataloguing.

e) Academic special libraries

The German Library Institute has registered approx. 1,700 (1693) libraries of this category. The largest sub-group are the parliamentary and administrative libraries (about 955), out of these

- 70 apply electronic data processing for acquisition, cataloguing and documentation work and
- 80 plan to do so within the next years or plan to expand their existing systems.

As far as other groups are concerned we will only mention the ecclesiastical academic libraries. One of these libraries, namely that of the Landeskirchenamt (Office for Church Administration of the Federal State) München has an independent electronic data processing system.

PUBLIC LIBRARIES

From the 983 public libraries known to us, about 150 applications of electronic data processing were registered.

Electronic data processing is mainly applied for circulation control and statistics; cataloguing and administration follow at a distance. About 25% of the larger public libraries (holdings more than 100.000 media units) do their circulation control with the help of computers.

The extent of application of new information technologies in the libraries of the Federal Republic of Germany (and Berlin West) is shown in the diagrams 1 and 2.

THE USE OF NEW INFORMATION TECHNOLOGIES (NITS) IN LIBRARIES IN THE FEDERAL REPUBLIC OF GERMANY

(Results of the Study EEC-LIB2/5)

While rummaging through a pile of dusty old magazines, I found an old and familiar friend: a copy of the first serials catalogue for a single library. This catalogue was part of the first cooperative system for serials cataloguing in the Federal Republic of Germany, well known to us today as the "Serials Database" (ZDB). It was the first real computer-produced catalogue and looked like a normal printed catalogue. Finding this relic from my first decade of dealing with library automation, I remembered how very proud we were.

However, the aim of my paper is not to present historical facts. Rather, I would like to present some figures showing the large number of applications for the new information technologies (NITs) in libraries here in Germany, and to look for points or interfaces of international cooperation.

1. Introduction

Before discussing the use of NITs in libraries, I would like to provide a brief overview of the library landscape in the Federal Republic of Germany.

Categories and Number of Libraries

As we look around us, we will see a large number of different types of libraries.

These can be divided into two broad categories: ACADEMIC and PUBLIC libraries. The latter can be subdivided once again into a number of subcategories.

First, there are the libraries with supra-regional functions. These act as part of the national library, which, for well-known political reasons, does not exist in actual fact. These libraries are:

- the Deutsche Bibliothek (DB), Frankfurt/Main

- the Bayerische Staatsbibliothek (BSB), München
- the Staatsbibliothek Preussischer Kulturbesitz (SBPK), Berlin

and

- four central special libraries (economics, medicine, technology, agriculture).

Secondly, there are the libraries responsible for collecting the literature of a region, such as a German state.

Additional groups are:

- the university libraries
- the libraries of colleges and polytechnical colleges
- the academic special and institute libraries.

Unfortunately, we do not know the exact number of libraries. We can guess, however, that above a certain size - between 5,000 and 10,000 volumes, say - the category of academic libraries comprises about 2,000 libraries of different kinds.

The largest group, with 1700 members, consists of the academic special libraries. These figures do not include the institute libraries in existence at some universities; these have been included under academic special libraries. We can only surmise that, among these, there are at least one thousand of major importance.

An what about the number of public libraries?

According to the German Library Statistics (DBS, Deutsche Bibliotheksstatistik), which are collected and published at regular intervals by the German Library Institute, exactly 983 libraries are registered for the year 1985. There is, however, also an indeterminate number of libraries not registered with the DBS.

Responsibility for the Libraries

Where does responsibility for the libraries ultimately rest?

In the Federal Republic of Germany, there is no central responsibility for national cultural affairs and therefore none for libraries as a whole.

The German Federal Government supports only a small number of libraries, such as the libraries with supra-regional functions and the libraries of the Federal Ministries.

The individual German states, including West Berlin, are responsible for university and college libraries within their jurisdictions, while the municipalities and districts maintain public libraries. Moreover, there is a large number of academic special libraries run by private firms, ecclesiastical bodies, and other organizations.

Funding

Library budgets are currently funded by the authorities supporting them in each case.

Development projects, large investments and supra-regional collections are financed mainly by the following institutions:

- the Federal Ministry for Research and Technology
  (Bundesministerium für Forschung und Technologie)
- the Federal Ministry for Education and Science
  (Bundesministerium für Bildung und Wissenschaft)
- the German Research Society
  (Deutsche Forschungsgemeinschaft, DFG)
  and , to a limited extent, by two foundations:
  VW Foundation (Stiftung Volkswagenwerk) and the
  Bertelsmann Foundation (Bertelsmann Stiftung).

Building projects for university libraries, capital requirements for major pieces of equipment (such as a mainframe computer), and the stocking of new libraries are accomplished via university building funds (Hochschulbauförderung), with the German Federal Government carrying 50 percent of the resulting costs, and the individual German states the remainder.

Short History of EDP Applications in Libraries of the Federal Republic of Germany and West Berlin

The first steps toward electronic data processing in libraries were uncoordinated efforts made at individual universities or at large public libraries between the mid and late 1960's. For a long time, cataloguing and circulation control were the main objectives of these efforts.

During the second phase of development immediately following the one described above, efforts were made in the sector of academic and public libraries to better coordinate the development of electronic data processing systems. These efforts focused on the development of uniform rules for cataloguing (RAK), on the establishment of a uniform format for exchanging data (MAB1), on the central promotion of software developments for online and real-time cataloguing and for the production of printed catalogues, and on the establishment of central services and standard files.

These efforts were backed up by the "Recommendations" (1) of the German Research Society (DFG) "for the creation of regional library centres. These recommendations provided the impetus for establishing seven such centres in the Federal Republic, as well as for establishing and extending two supra-regional network systems: the Serials Database (ZDB) and the Union Catalogue of Monographs (VK).

These recommendations were complemented in the spring of 1986 by the "Suggestions" (2) for making functional connections via networks on the local, regional and supra-regional level. For academic libraries, at least, these two papers represent the basis for all future plans regarding electronic data processing.

At present professional discussions and development projects in this area are focused on the following topics: the interconnection of individual or regional network systems, the retrospective conversion of the card catalogues into a form that can be read by machine, and the introduction of independent library systems on the local level. The later encompasses systems for acquisition, local cataloguing, circulation control, and OPAC as well as for the import and export of machine-readable data from other databases.

Research has revealed that academic and public libraries require different kinds of hardware and software, but that the primary need of both is for and integrated system.

Moreover, many of the university libraries find that their present equipment, which was installed between the late seventies and early eighties, now needs to be updated.

It is, therefore, of the utmost importance that the basis for the ongoing cooperation be strengthened by the following measures:

- attempts to consolidate the individual networks
- organization of intra-regional cooperation
- development of network infrastructure and communications software in accordance with the advanced communication guidelines (in particular Level 7) contained in the OSI (Open Systems Interconnection) Layer Model.

Additions to these basic requirements should be agreed upon on a national and international level.

2. Detailed Applications of NITs

In the following brief look at detailed applications of NITs, I have had to use the figures and comments compiled for the year 1986.

The diagrams and tables show the extent to which EDP applications are used in German library/information systems.

It must be borne in mind that the percentage of EDP applications of any kind is highest for the supra-regional, regional and university libraries (see Table). These libraries were connected, to a certain degree, in a regional network for cataloguing in 1986. This high percentage continued to grow in 1987, especially within the southwestern cooperative system.

Taken together, these databases, which contain 13 million catalogue entries, have attained the dimensions of the OCLC databases. To a certain extent, however, there are duplicate entries. If the individual databases could be merged, using sophisticated duplication check programs, the number of titles would be 30 percent lower. We could expect, in this case, a data base containing 8 to 9 million titles.

Another important fact that must be taken into consideration here is that there are an additional 2 to 2,5 million records in the academic special libraries. However, these records represent entries for different materials: monograph or serials titles and titles of papers, all catalogued according to different cataloguing rules, with a low degree of standardization.

The same is true of the public libraries. Although the number of titles recorded is around two million, there is little standardization; existing systems range from short title entries up to cataloguing for public libraries on the basis of special rules.

The Most Important Computer-Aided Catalogues

Individual Catalogues

Computer-aided catalogues have been produced in the Federal Republic of Germany since the early sixties, beginning in individual libraries. Some examples of these are the following university libraries:

- Augsburg
- Bielefeld
- Bochum
- Bremen
- Regensburg
- Ulm.

Some of these catalogues, i.e. their data und the necessary programs, were conceived as batch networks. The University Library Centre (Hochschulbibliothekszentrum) of the University of Cologne, for example, was set up on the basis of programs from Bochum University, and the Bavarian network is based on programs from the Library of the University of Regensburg.

Regional Networks for Online Cataloguing

In accordance with the "Recommendations for building up regional network systems and for establishing regional library centres" (1) published by the German Research Society (DFG) in 1979, eight network systems have been established; seven of these were regional network systems and the eighth was the network set up for the libraries of the Supreme Federal Authorities in Bonn (VBB = Verbund der Bibliotheken der Obersten Bundesbehörden).

The situation existing in 1987 is described below and illustrated in the table provided at the end of this paper:

- Seven of the network systems were already functional, i.e. Berlin, Hamburg, Lower Saxony (centre in Göttingen), North Rhine-Westfalia (centre in Cologne), southwest (centre in Konstanz), and Hessen (centre in Frankfurt), with the hardware, software and administration located at the network centres.

- The Bavarian network, with centre in München, is in the preliminary stage. This network has the largest volume of machine-readable records to be transferred from the batch system to the online network. It is envisaged that the real-time cataloguing will then take place in mid-1988.

Furthermore, there are regional batch network systems for the cataloguing of periodicals on Lower Saxony, Bavaria and Hessen.

Supra-Regional Cataloguing Networks

The German Bibliography (Deutsche Bibliographie) is produced by the German Library in the exchange format DB-MAB. There are two large supra-regional (union) library catalogues existing at the moment, both located at the German Library Institute (DBI):

- The "Union Catalogue of Machine-Readable Data for German Libraries" (VK), which records the locations of monographs and dissertations. The latest edition contains about four million titles, originating in individual catalogue files in different libraries and networks. Those files in different formats were merged and duplicate entries eliminated. The catalogue is printed on microfilm.

- The "Union Catalogue of Periodicals with Serials and Serial Titles" (ZDB) showing the location of about 450.000 and 1.5 million titles, respectively.

Both catalogues are still batch systems. Copies of them are also accessible online via the

German packet switching network DATEX-P and the retrieval language GRIPS.

An online/real-time database management system for the Periodicals Database has now been released for testing purposes.

Equipment of the Network Centres

The decision as to which hardware and software packages are to be used may be of great consequence for future cooperation between the regional and supra-regional network systems.

At present the situation regarding hardware is as follows:

> Six of the eight centres are using Siemens mainframes, with the possibility of interconnecting them for five centres. One of them is, for reasons of data security, not accessible from outside.
> Two of the centres use IBM computers.

Quite a different situation exists concerning software packages for cataloguing purposes, namely:

> Four of the centres use IBAS/BIS software, but they differ in many important respects, such as in the way they handle files, use commands, etc. Three use the ADABAS-based cataloguing package HEBIS.

Both IBAS and HEBIS are real-time programs, which means that the index files are updated immediately. The third catalogue program, which is used in Lower Saxony, is named GRIPS and is batch-oriented in updating the index files.

Interconnection of the Network Centres

With one exception, it appears to be possible to interconnect the network centres in order to use programs and files. Two of these centres, the German Library and the centre for Lower Saxony in Göttingen, are already connected to the Siemens mainframe at the German Library Institute.

Organizational Functions

The following part of this paper will provide an overview of the extent to which EDP is used in the areas of acquisition, circulation control, serials processing, interlibrary lending and information supply using remote databases. Major changes are expected to take place in these areas within the near future.

Circulation Control

In the course of the EEC-LIB2/5 study, it was discovered that 42 academic and 70 public libraries make use of computer-aided circulation control. There are a large number of different systems in use, ranging from those developed in house to turnkey solutions.

Circulation control is only of minor importance for academic special libraries.

Acquisition

Systems for the acquisition of monographs are used by a small number of academic and public libraries; as can be seen from the Table, these systems involve ordering and control of supply only. The same thing is true for automated acquisition for serials control. We can only surmise that this is caused by the lack of cheap hardware and software. This is a potentially large area for micro- and mini-computer applications in the near future.

EDP Statistics

Statistical records concerning the accessions record of the libraries, i.e. type of acquisition, subject, number of volumes, price and type of publication, are available at 21 academic and 68 public libraries. Statistical data on accession records and circulation are very important to show cost-benefit relationships, especially for public libraries.

Interlibrary Lending

In the Federal Republic of Germany, interlibrary lending is carried out in one of two ways:

- through central catalogues (Zentralkataloge) at the seven centres distributed throughout the country

- by means of a direct request made by the requesting library to the delivering library (after consulting a union catalogue).

In 1985 the number of requests dispatched via the central catalogues (monographs and articles from periodicals) comprised about 2.3 million orders. On the basis of another study (3), we can assume that the major share (61 percent) of interlibrary lending concerns modern humanities, covering mainly the years of publication between 1801 and 1970. Requests from abroad amounted to about 124.000.

The handling of one interlibrary lending request costs about 20 Deutschmarks. Consequently, interlibrary lending costs come to a total of 40 to 45 million Deutschmarks every year.

Interlibrary lending is partly integrated into the existing circulation systems. Lower Saxony has an interlibrary lending network with an online ordering component.

EDP-assisted processes, i.e. microfilm union catalogue, online catalogues and online ordering, all simplify and speed up interlibrary lending considerably.

The time required for placing the different kinds of ILL orders has been reduced from an average of 30 days for an order made by conventional methods to 20 days for a directly automated order or only a few days for an online order.

Information Supply Using Databases (IVS in the Table)

No online searching of remote databases is undertaken at public libraries. In the supra-regional, regional and university libraries, however, about 45 percent serve as online intermediaries. The total number of academic a special libraries offering online searching is not known.

The rate of utilization is between 40 and 100 searches per month, whereby the special libraries perform about 500 searches per year, mainly in factual/numerical databases. Altogether about 15 national and international host computers are accessed by the libraries: CBI, DATASTAR, DBI, DIALOG, DIMDI, ECHO, ESA-IRS etc.

3. Conclusions and Recommendations for International Cooperation

In the area of cataloguing the following conclusions can be reached:

- There exists a large number of machine-readable catalogue records. These are distributed among the eight cataloguing networks systems, the supra-regional network systems and a few individual academic and public libraries. Direct access to this information will exert a considerable influence on the time required to process ILL requests and will serve as a resource for cataloguing.

- There are a large number of card catalogues which are important for interlibrary lending, but which are not yet available in a form that can be read by machine.

- Unfortunately, major obstacles to rapid progress in cooperation between the libraries and the utilization of technical data networks are posed by the different types of equipment (mainframe computer) as well as by the different types of software, recording formats and cataloguing rules.

In the area of organizational functions, the following conclusions can be reached:

- There is a lack of local systems for cataloguing, for online public-access catalogues, for acquisition and for serials control which are capable of interfacing with local, regional and supra-regional networks of different kinds.

- Providing or adjusting separate computer systems for the 57 university libraries and their major subject libraries within the next five years will cost approx. 50 to 100 million Deutschmarks. For this reason, it is necessary to reach an agreement before introducing any system.

- A growing number of the 1700 academic special libraries and public libraries require assistance in the introduction of stand-alone hardware and software packages for both micro- and minicomputer applications. Here is a chance for institutions like the German Library Institute to assist in setting up standards.

Recommendations for International Cooperation

Intensified international cooperation is recommended in the following fields:

- Agreements on using OSI Guidelines
- Development of network software
- Joint utilization of software and joint ordering from firms
- Agreements concerning observations of standards and compatibility criteria; standardization of character sets for the exchange of data and communication.
- Investigations concerning the possibilities for exchange of data, organized according to the different cataloguing rules (e.g. AACR2, RAK).

Examples of International Cooperation

In conclusion, I would like to give two examples of international cooperation:

1. The OCLC and the German Library Institute have investigated the possibilities for an exchange of bibliographical records. The results of this investigation show that there is room for optimism regarding future cooperation (see the paper by David Buckle included in this volume).

2. Stimulated by the results of the study, the German Library Institute has decided to assist the academic special libraries in introducing local systems. With the help of the Ministry of Education and Science, we have undertaken a project for special libraries in close cooperation with IME, London and using their software package TINMAN/TINLIB.

I personally hope that the international cooperation that has just begun in this field will be successful.

[1] Deutsche Forschungsgemeinschaft, Bibliotheksausschuss, Unterausschuss für Datenverarbeitung.
Empfehlung zum Aufbau regionaler Verbundsysteme und zur Einrichtung Regionaler Bibliothekszentren, Bonn-Bad Godesberg 1979.
(German Research Society, Library Committee,
Recommendations on the Setting Up of Regional Networks and on the Establishment of Regional Library Centres, Bonn-Bad Godesberg 1979)

[2] Deutsche Forschungsgemeinschaft, Bibliotheksausschuss, Unterausschuss für Datenverarbeitung und Kommunikationstechniken.
Vorschläge zur Weiterentwicklung der Verbundsysteme unter Einbeziehung lokaler Netze. Bonn-Bad Godesberg 1986.
(German Research Society, Library Committee, Subcommittee on Data Processing and Communication Technologies. Recommendations Regarding the Further Development of Network Systems Including Local Networks. Bonn-Bad Godesberg 1986).

[3] Kratsch, Werner: Untersuchung zur Struktur des Leihverkehrs der Deutschen Bibliotheken. Berlin: Deutsches Bibliotheksinstitut 1984 (DBI-Materialien. 27).
(Kratsch, Werner: Investigations on the Structure of Lending at German Libraries. Berlin: German Library Institute 1984. German Library Institute Publication N. 27).

Appendices

MAP
Diagram
Table

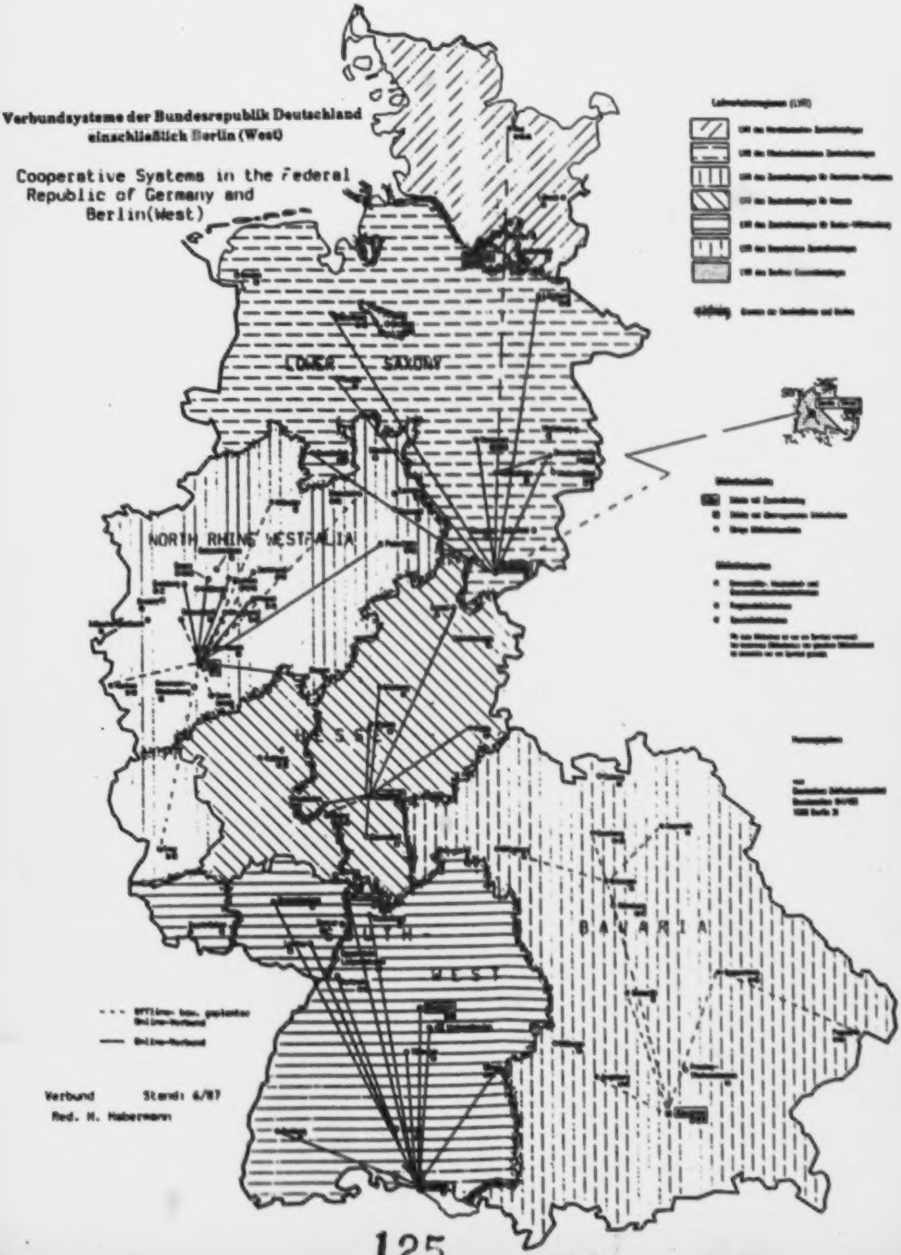
Translation of terms used in the Table:

Bibl. Typ	Kind of library
Anzahl	Total number of libraries in this category number (NITs) = using NITs
Erwerbung	Acquisition
Monogr.	Monographs
Haush.	Housekeeping functions
Stat.	Statistics
Zs.	Serials acquisition
Katalogisierung	Cataloguing/documentation
Dokumentation	Circulation
Ausleihe	
Orts	Circulation control
ILL	Interlibrary Lending
IVS	Information supply using online databases
Anzahl	Number of machine-readable records
Datensätze	
Monograph.	Monograph records

Zs.	Serials records
Zahl der Teilnehmer an Verbünden	Number of libraries participating in cooperative systems
Nat. Bibl.	National library
Regional	Regional library
Univ. Bibl.	University library
Hochsch.-Fachhochsch.-Bibl.	College / Politechnical libraries
Spezialbibl.	Academic special library
Parlaments/Behörd. Bibl.	Parliamentary/Ministry libraries
Kunst-Bibl./Kulturinst.	Libraries for the arts
Industriebibl.	Industrial libraries
Öffentliche Bibl.	Public libraries

Appendix 1

Arbeitsgemeinschaft der Verbundsysteme



Verbundsysteme der Bundesrepublik Deutschland einschließlich Berlin (West)

Cooperative Systems in the Federal Republic of Germany and Berlin(West)

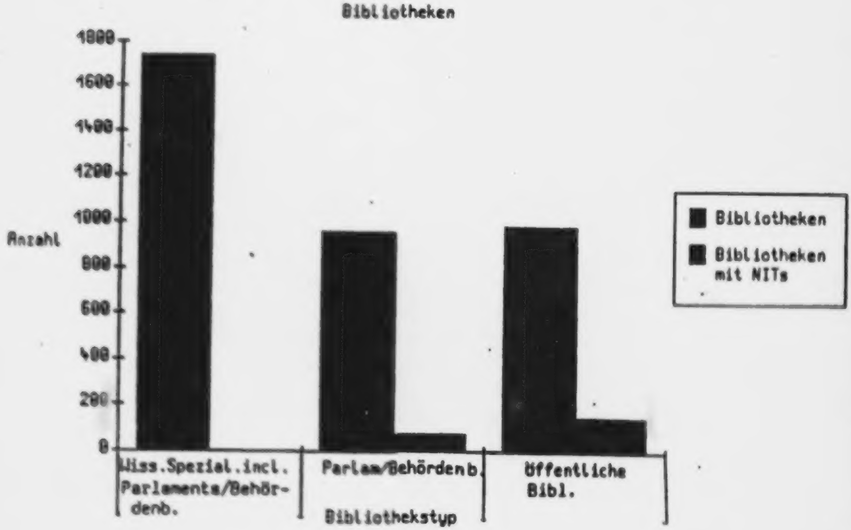
LOWER SAXONY
NORTH RHINE WESTFALIA
HESSE
BAVARIA
WEST
- - - Offline- bzw. geplanter Online-Verbund
—— Online-Verbund

Verbund Stand: 6/87

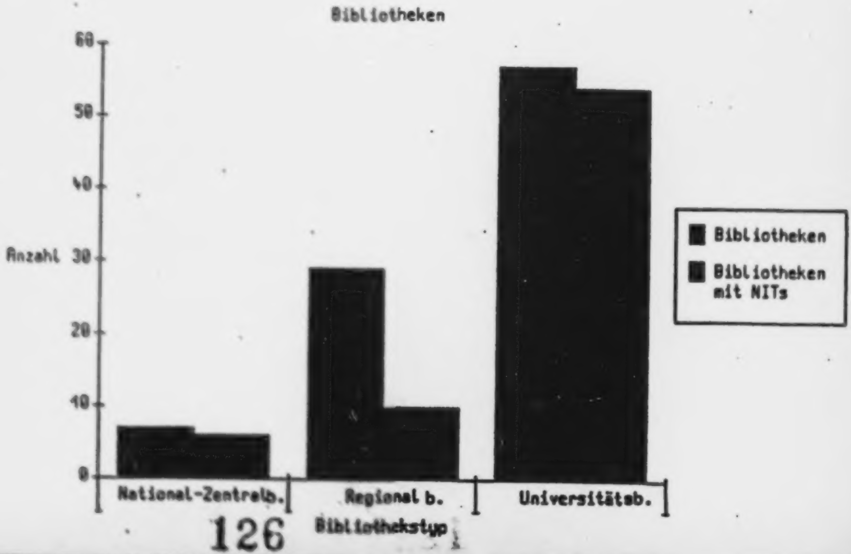
Red. H. Habermann

Appendix 2

Einsatz neuer Informationstechnologien (New Information Technologies/NITs) in deutschen Bibliotheken insgesamt



Stand: 1986



Appendix 3

Bibl.Typ	Anzahl		Erwerbung				Katalogisierung /Dokumentation	Ausleihe		IVS	Anzahl Datensätze		Zahl der Teilnehmer an Verbünden
	gesamt	NITs	Monogr.	Haush	Stat	Zs.		Orts	ILL		Monograph	Zs/Ser	
Nat. Bibl.	7	6	-	2	2	-	6	1	-	5	↕	↕	4
Regional	29	10	-	-	-	-	10	↕ 33	↕ 15	↕ 37	↕	↕	10 ↕ 39
Univ.-Bibl.	57	54	8	5	15	4	45	↕	↕	↕	Σ 13.3 Mio	Σ 1.6 Mio	29
Hoch-Fachh.-Bibl.	147	6	?	?	?	?	6	4	↕	1	↕	↕	6
Spezial-Bibl-	↕ 1740												
Wiss. Spez. befragt	5	5					5	3		5	273.000	200.000	
Parlaments/ Behörd. Bibl.	955	70	4	4	4	7	50	1		16	(700.000 - 1 Mio)		5
Kunst-Bibl/ Kulturinst.	8	2	?	?	?	?	2	-		-	(255.000 Monogr)		
Industrie bibl.	↕ ?										(> 1.0 Mio)		
öffentliche Bibl.	983	86	4	13	68	?	18	70			(1.5 - 2 Mio Titel/Kurztitel)		Prog. BASIS 38 Biliotheken (NRW)
ÖB Medienbest. ≥) 100.000	200	50											

Tabelle: Stand der Anwendung neuer Informationstechnologien (NITS)
in Bibliotheken der Bundesrepublik

HISTORY OF LIBRARY AUTOMATION
NOSTALGIA OR ADVICE FOR THE FUTURE

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HISTORY OF LIBRARY AUTOMATION
NOSTALGIA OR ADVICE FOR THE FUTURE

MORTEN HEIN
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Abstract

It is often good advice to find excuses for reconsiderations. Also in library automation. These years bring for the first time in library automation aspects into consideration, that could not be estimated by the information specialist.

The experience of information handling through 30 generations made it easy for librarians and information specialists to specify electronic information systems that for the first 3 decades of library automation could not be fulfilled by the computer people.

Remember - or imagine for those who were not present - the struggle for an upper and lower case print chain!

The information specialists supremacy is overruled these years by technologies that surpass earlier demands and imagination. This could downgrade the information specialist and the trade itself. The computer people are producing systems for information handling, that could not have been foreseen 3 decades ago.
Is there still something left for the librarian. Have we learned the lessons from experience gained until now? Can we still specify systems and devices not yet developed by the computer people?

What were the objectives when setting the course in library automation. What price did we pay for this progress - and why have progress after all been so long time en route?
This is the theme for the actual paper. There will be a lot of tentative answers based on arguments and examples from the past and present. The main theory for the conclusion is, that major achievements have been gained and that the old time librarian, by learning from experience, is still capable in specifying the information systems and tools for the future.

HISTORY OF LIBRARY AUTOMATION
NOSTALGIA OR ADVICE FOR THE FUTURE

Library Automation and other Explosives

In Danish we have a proverb: He didn't invent the gunpowder. It has also an extended version: He didn't invent the gunpowder, but he was in the room next door.

I neither invented the gunpowder nor the library automation, but perhaps I happened to be, not in the next room, but a few more rooms away.

Talking about the history of library automation is very dangerous in this audience. It is history of the contemporary time and most people involved are still alive, so whatever I say, it could perhaps please some, but somebody else could be very upset. But nevertheless this is my personal reflection.

Only White Elephants?

Being in a bad mood one could consider the history of library automation as one long line of white elephants, because we have made quite a number of mistakes during the years. But some of the mistakes contained something new and very necessary for the times to come. Don't judge a phenomena as a white elephant the first time you see it. Wait and give it a chance. Therefore it could be the time for doing reconsiderations.

I am consultant, and as a consultant I have no direct responsibility for anything. I have no system to defend, so I can be more objective to what YOU have done. And try to characterize.

I am from a family of librarians, I should mention as a background. An exhaustive overall counts for more than ten librarians in the family. I could mention my late aunt. She was employed in the Copenhagen Public Library in 1913, she won her profession by using new information technology, because she could use a typewriter, quite advanced for those days.

A Breaking Point?

Why should we discuss the history of library automation? I think, that we are at a kind of a breaking point. Of course anything could be named a breaking point as an excuse. But we have seen 25 years of library automation - or more. In that period it has been a consistent struggle to have the computer to do exactly what you demanded and wanted it to do.

Librarians and information specialists could foresee the possibilities in computers, even if the computers could not do the job. It has been a very long struggle to persuade the computer people to do the information business the proper way. The systems were very new and very cumbersome and could not fulfill even simple demands. But now we see - for the first time - systems coming directly from the manufactures doing things sometimes a little bit beyond our imagination. It is the first time in the history of library automation, and that is a breaking point of some significance.

Are we specialists?

We are information specialists and have had the task of specifying systems beyond the reach of the manufactures up till now. Therefore we should be very proud of ourselves. I had the intention to say some nice words about the profession, but a short while ago I read the biography of Alan Turing, the British mathematician. And I realized that information people, as we know them in the libraries are not that advanced. I read how he was doing digitize of sound for telephone scrambling during the war. By doing so he was perhaps the founding father of the CD-ROM in 1944. People of that kind have a programming language named after them. What do you name after librarians?

We are untrustworthy

Why do library automation looks as it does today? Partly because libraries are untrustworthy. We must admit, that manufactures have not seen the big business in libraries. That is our biggest problem to my mind. We have never been taken really serious. The big money is not where we are.

We have seen a number of big companies trying to do business in our area, but not doing any serious business. Let me give some examples: Back in the sixties all of us thought, that Siemens would take the European market after some successful results in Germany. Our Swedish colleagues even bought Siemens to adjust to the situation, but Siemens lost interest, perhaps the market was not there, perhaps we were not serious enough, we were untrustworthy.

A few years later IBM also tried the library market again after the initial bunch of 1. generation punched cards systems , and was doing a big effort in promoting the ELMS system. But suddenly they lost interest in the library market on both sides of the Atlantic, leaving DOBIS/LIBIS as the only remain.

Remember ICL with their MARC-software package that suddenly was non-existing? - Or Plessey with a reasonable success in circulation control systems until they disappeared?

Today the companies supplying library automation systems are small and dedicated. A strange fact in a world where supplies tends to come from bigger and bigger industries. We are relying to an unusually degree on small industries. Perhaps one has to be small and dedicated to understand our special world.

Too High Costs

Another reason, that has delayed the development, was the fact, that library automation was expensive beyond compare in the old days. It is impossible to understand how managers of library automation 20 years ago could persuade anyone to offer money for that kind of operations, because it was that big money.

I made a small online cataloguing module back in 1970 together with IBM Denmark. In that period an IBM 2260 VDU, gone many years ago, had a price of da.kr 70.000. That was two times the annual salary of an ordinary librarian. To make forecasts in those days, that there a few years ahead would be VDU's on anyones desk in a library, was pure madness. You were not serious. Today a simple VDU costs a split part of the month salary.

The change from then to now is so big, that we can't really imagine how people could have the idea of specifying solutions so expensive.

In that little system all keying was done in upper case. In the computer it was converted to lower case - and through an algorithm the appropriate letters were again changed to upper case. A computer person once said to me: That habit of yours with upper and lower case letters, isn't it just a bad habit? Why don't you just leave it? My answer was: It may be a bad habit, but it is rather common, so we will like to stick to it.

It was that kind of silly questions librarians got in those days.

In the experimental system we could print the recorded items. We were so lucky, that we could use the 1403 print chain of the Technical University Library in Copenhagen. They had just got one of the very famous ALA print chains. It is actual still in use.

We did other stupid things in those days: We had a Danish project called 'På talefod med datamaskinen' that is: On speaking terms with the computer. In a 3 month period 23 public libraries had a typewriter-type terminal connected to a central computer, so all borrowers could get hands on experience with computer power. It was a success but quickly forgotten. Again it was too expensive and impossible, who could see the use? Today I don't know how many children's libraries that have computers for playing and for serious work. We needed the micro to do it at a low cost.

Kings and Wars

Historians of a certain nature often pinpoint history to kings and warfare. I shall try to do that.

Two things started me off in this subject. I had been a little interested in computers and then one day I was so happy to hear a lecture by the late world famous Indian librarian, Ranganathan. He was talking about his Colon classification. I thought it was pure Indian mysticism. But I realized that what I had just learned on computers described a tool, that could handle the complex logics Ranganathan described in his classification.

Some people, more clever than I, invented the Precis strings, to be considered as the computer version of Ranganathans Colon classification. It was the combination of computers and Ranganathan that made my interest.

Systems Development Trends

In the embryonic age we had two lines, perhaps two and a half, in systems developments.

One was going in the bibliographic direction. For some years the printed book catalogues had been the big invention, specially in the United States. They were produced according to strange methods. E.g. from cards, where each printed line had its own card. The line could be typed on a composer. The cards were send through a camera, where each line was recorded on a film to form the complete film setting for a page. They could be hand sorted and cumulated - or you could put holes in them and do the sorting on a machine. There were obvious reasons to try beyond the camera and the punched cards, using a computer. That was the start of bibliographic data processing.

It was not possible to use centralized cataloguing services in the photo-mechanical book catalogues as used in the days of the card catalogue. But for the computer production a nice transport device for bibliographic information, known as the MARC-format, improved operations.

The other development line was the house-keeping systems with bunches and piles of punched cards, except in Germany where they used paper-tape. The systems were embryonic white elephants. A reference to the period is: Dataprocessing in the Library. By Schultheiss, Culbertson and Heiliger. N.Y. Scarecrow Press, 1962. Often referred to as 'The Silver Book'. A very good tutorial to the period.

We also got information retrieval in those days, starting with edge-punched cards. Have you ever tried the method? You inserted knitting pins in the holes representing your descriptors, and your hits were just falling to the ground, very efficient. Later it became more advanced and left the library, to come back again through terminals and now CD-ROMs.

The Real Thing

Up to the early sixties most library automation was toys for playing, but then things started to happen. Let me give examples:

A little notice in the annual report from The Council of Library Resources: In December 1965 a grant of $145.000 was given to a MARC-pilot project. That were big news, even if it was not recognized immediately.

We got a number of exiting systems. Let me name some of the systems, which I think made a contribution to the general development:

In Europe it will of course be natural to mention Professor Pflug and Bochum. Bochum was in the sixties a 5-star must for the travelling librarian who sought information on library automation. It is difficult to understand how the success emerged, for it must have been difficult, cumbersome and very expensive to achieve the effort. But the effort of Professor Pflug had a very good influence on the German scene, with a long string of university library systems coming out from Bochum. It was a great inspiration for Europe.

Another system, perhaps not that known, came from Chichester, West Sussex in the UK. The librarian Gordon Bearman, who retired many years ago and became a vicar in a nearby town, made the first really efficient public library system. So Bochum and Chichester were the two places to go for inspiration.

Joint Efforts

After this it was no longer that local systems were in the focus point. Now, many years after, local systems are back again. It was the time for the joint efforts. I mentioned the CLR grant to the MARC project. Library of Congress invented MARC as a mailing service to succeed distribution of printed cards, but it didn't see the perspectives itself. It had to be switched to the UK in British National Bibliography with Jack Wells to be recognized as a very efficient tool of information interchange. The real MARC development to my opinion took place at the old BNB in London, the internationalization hand in hand with the ISBN development.

To be precise, Jack Wells did the international development, but the first example of practical usage in a multi-lingual environment came from Professor Pflug in 1969.

I should also mention some North American examples. The first was considered a failure in its time, it was the RECON project. A far too advanced project for automatic conversion of bibliographic data from printed form to machine-readable form. A failure due to the absence of an adequate technology. It is one of the few areas, where we still are waiting for the technology. The project was made by the Library of Congress and Henriette Avram, the originator of MARC.

Then I should mention OCLC and Fred Kilgour, because here we have the large scale operation in library automation. Here libraries became visible to the outside world. Now it is known, that we are reasonable serious in business. That libraries are trustworthy. For that reason OCLC is so important, not only to the member libraries, but to the library community as such.

If we sometimes failed, it was not always our own faults, but often caused by the awkward prehistoric devices we had to use. The successes mentioned - and quite a few more - were gained on very unfavourable odds, technological speaking.

Film Examples

At this point in the paper 3 examples of early systems will be shown on super-8 film, even without the possibility to reproduce the film; some comments can be given:

1. Circulation control in the Roskilde County Library. Test system in 1968. Each book was circulated with a punched transactions card expressing a serials number. There was no connection between bibliographic data and the transaction-ID.

The data capture took place with an Olivetti data collector intended for recording of information in production. The result was a paper tape for afterwards processing on a mainframe.

The system was very basic in design, with punched cards as transactions identifiers, leading to many mistakes. A real white elephant and rather outdated by the standard of 1968.

2. Circulation control in a branch in Malmö City Library, a 1969 system made by Bibliotekstjaenst in Lund, Sweden. Each book had an identifying punched card for circulation. The recording took place on an Addo-Arenco device with push-buttons to select the transactions type. Data were recorded on paper tape for later processing.

A prototype for the present Swedish BUMS system.

3. Circulation control in a branch in the County Library of Northern Jutland. This evaluation system was made in 1970 by RC Computers. A true white elephant, but for another reason. It was too advanced for its time and could not be foreseen in production at an acceptable cost.

Each book had an omnidirectional barcode outside the binding. The book ID number was captured by a video camera, the signal was subsequently read into an analog/digital converter using pattern recognition in a RC7000 minicomputer for further processing (again on paper tape).

It was the fastest circulation system I have ever seen, but much too early in the general development.

Conclusion?

These examples were shown as pure nostalgia, but were examples not only for laughter, but also to bear in mind that developments, e.g. the upper/lower case print chain were achievements, we never would have had, if we had not put forward our professional demands.

From the very short history of library automation we can learn, that we are able to make our specifications, that we are able to design systems and to be persistent in demanding the solutions that will fulfill our ideals. We have made many mistakes in introducing data processing, but so have for sure most other professions. Bear in mind that automation, as known to us today, compared to the automobile industry, has advanced to a period around 1918. That is our level for today, we still have some expectations of things to come in the future. But you can still learn quite a lot for the future by studying both your results and your mistakes from the past.

LIBRIS IN THE MELTING POT

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LIBRIS IN THE MELTING-POT

LARS-ERIK SANNER
STOCKHOLM UNIVERSITY LIBRARY

Abstract

LIBRIS is the co-operative library computer system for research libraries in Sweden. It started fifteen years ago on a Swedish SAAB main-frame and was conveyed to an IBM environment in 1980.

At present the database contains some 1.5 million records, the system is steadily supporting cataloguing and searching, and a little more than 20 libraries are participating in the network.

The local equipment for interaction with LIBRIS is made up of NOKIA VDU terminals, clustered to a MIKKO-concentrator providing the IBM 3270 protocol and devices for motoring the extensive character set. This equipment is now seven years old and is beginning to show signs of the weakness of old age. This is one of the reasons for considering the future of LIBRIS. Other reasons are the mushrooming of local stand-alone systems, new computer technique and improved means of communication. During the last years a special task-group has studied the conditions and pre-requisites for a LIBRIS IV as a successor to the present LIBRIS III. Different alternatives have been considered against the background of what is going on locally at many of the participating libraries.

The result of the study is a recommendation that LIBRIS III is to be kept more or less as it is, with only some slighter modifications. Many questions are, however, still unanswered and there is a great likelihood for the LIBRIS problems needing to be coped with soon again.

LIBRIS IN THE MELTING-POT

For a national, all-embracing, co-operative on-line catalogue system, LIBRIS has been in operation for a comparatively long period. After due analysis and studies, both at home and abroad - e.g. or I should perhaps rather say "of course" at the at that time famous Bochum University Library - LIBRIS started in 1972 with the input of records from Linköping University Library and from the Swedish national union catalogue. In 1974 five academic libraries were connected to the system. Next year the number of cooperating libraries was doubled and new software was constructed which signified the transformation from LIBRIS I to LIBRIS II. In 1980 the system started full scale operations with the kind of software and hardware which is still in use today.

In the early stages development of the system was an experimental project carried out by the Swedish Agency for Adminstrative Development, AAD. The system was programmed for and run on a Swedish SAAB main-frame computer. You may recognize SAAB as a manufacturer of cars and aircraft but at that time they also took an interest in computers. The participating libraries used Incoterm terminals, for that time an advanced and quite intelligent type of terminal. What signified the change from the introductory, experimental phase during the 70's to full-scale implementation in the 80's was, among many other things, the transfer of the system from the SAAB computer to the IBM environment of the State Computer Service Agency, DAFA. That meant the beginning of the next LIBRIS generation - LIBRIS III. Today's LIBRIS is operated on an IBM 3084 which is soon to be replaced by an IBM 3090. For communication with the approximately 800 terminals, half of which is synchronous and half asynchronous, LIBRIS uses a communication computer type IBM 37XX and a protocol converter IBM 7171. There is a leased network of telelines for the synchronous communication and there are ports for X.25, 3725, and 7171 connections as well as the possibility of dial-up connection. A number of IBM standard programmes are used - in the first place the operative system MBS, and IMS and VTAM for database management and data communication, in addition to a great deal of special application software.

The libraries within the network, have equipment which up till now consists of asynchronous Finnish NOKIA terminals clustered to MIKKO-concentrators, likewise Finnish which provide the synchronous communication as well as the 3270 protocol to the central mainframe and monitor the large repertoire of characters used by LIBRIS.

A few words ought to be said about the managerial environment of LIBRIS. When it moved from the experimental to the full-scale phase it was, at the same time, also transferred organizationally from the AAD to the Royal Library as far as the responsibility for running the system is concerned. The Royal Library is responsible for the operations but uses - as I said before - the services of the State Computer Agency, DAFA. A third party is involved in the management of the system, namely the Delegation for Scientific and Technical Information, DFI, which is in charge of the further development of the system.

It is my personal opinion - but it is shared by many others - that the division of responsibility between the Royal Library, DFI and - to some extent - DAFA has been very disadvantageous for the system as such. It has made the process of management extremely slow which has in turn led to no development at all of the LIBRIS system during the first years of the 80's. These years were instead devoted to efforts, first to establish borderlines between what is running and what is development, then to investigating the possible future of the system. As Director of the Bibliographic Department of the Royal Library, I was at that time in charge of LIBRIS and as such took part in the study. But I am not the only participant at this conference who was involved in it. Svante Hallgren was another of the members of the special task group, for trivial reasons called the AFULU committee, which was entrusted with studying the future development of LIBRIS. A special analysis of the LIBRIS problems by Peter Noerr served as its main working document. The Noerr-report was not very deep-going but had a visionary approach to many of the problems around the LIBRIS system, which was very useful for discussion within the group. In the Noerr-report it was stated clearly for the first time that LIBRIS should not be a total library system but a central system, with central functions building on the strong aspects of the system - the database and the network. According to the original concept of LIBRIS the system should have provided every module which could be used by the participating libraries, not only shared cataloguing and the union catalogue function but also acquisition, checking of periodicals, circulation control etc.

According to the new AFULU-Noerr philosophy, circulation control, local catalogue, periodical control etc. should be handled by local stand-alone system at the individual libraries, whereas such things as authority control, interlending and of course catalogue support should be the tasks of the central system.

Eventually a development along these lines started to take place. DFI allocated means to the Royal Library in order to enable the library to establish a small development unit. This unit has since the second half of 1982 implemented - in cooperation with system analysts of DAFA - an Information Retrieval system - IMDOC - for the LIBRIS database. An interlibrary loan system has been developed on the basis of the electronic mail system of DAFA. That has now been used experimentally by three libraries for a quarter of last year and will, as of the turn of the year, cover all co-operating libraries. Communication software emulating the 3270 protocol has also been developed which makes it possible for libraries in the cooperative to use an ordinary IBM compatible PC for searching and recording in the system. In addition, a user-friendly PC-interface to the IMDOC IR system has been developed, especially intended for those libraries which use LIBRIS also as an online public access catalogue.

So far, so good. These additions and improvements have indeed been welcomed by the Swedish research library community, at my own library not least the possibility to communicate by means of a PC. This will, we hope, enable us to gradually replace the double set of terminals - one for LIBRIS, the other for our local system - which we are now forced to keep, with a number of PC-terminals which could be switched from the one system to the other. However, many things have happened within and around the LIBRIS system which have given the DFI and the LIBRIS advisory group at the Royal Library reason to look once again into the future prospects of LIBRIS.

One thing which has happened is that a number of Swedish research libraries have acquired or are just about to acquire their own local computerized library system. That was foreseen by the before-mentioned AFULU group of the early 80's, but perhaps not to the extent and in the variety of different systems which have since appeared. My present library, the Stocholm University Library, has a GEAC system operational since 1985. The Library of the Swedish University of Agricultural Sciences has a RC system. Linköping

University Library is also a GEAC library, whereas Umea University Library for the time being is implementing an IBM DOBIS LIBIS system. Quite recently the university libraries in Gothenburg and Lund have decided on one and the same local system. What kind of system has not yet been officially announced, but a good guess would be a VTLS system. The smaller academic libraries are either working with microcomputer solutions, or waiting for the AAD standard system for smaller or medium-sized academic or administrative libraries, which is under development, based on a system developed by the private Ericson telephone concern. A Norsk Data application which is under development at Lulea University Library, would also provide them with a possible solution.

This wide range of local solutions together with the fact that the local equipment of LIBRIS is aging and now fully paid for, was the starting signal for new considerations about LIBRIS and its library surroundings. To that was later added the fact that the Swedish government decided to wind up the DFI, replacing it with another agency with slightly different frames of reference.

A special committee, set up about one year ago by DFI and the Royal Library, in which I have been one of the members as a representative of the LIBRIS advisory committee, has produced a report about what is called LIBRIS IV. This report is supplemented by two very well put together and informative memos by two consultants - one about a possible alternative to DAFA as service agency for LIBRIS, the other about communication problems associated with the LIBRIS system.

The philosophy of the LIBRIS IV committee does not differ very much from the one adopted by the AFULU task group but is based on slightly different premises. Some of the obvious options - creating a quite new LIBRIS system or just amalgamating the LIBRIS network with another, bigger one like OCLC, RLIN or the like - have been rejected now as they were five years earlier. The idea of moving the LIBRIS data-base into another ready-made system was rejected in the first place because it seemed to be too difficult but it has appeared again in connection with the discussions about a change of computer service bureau. Considering the comparative ease with which a significant part of the LIBRIS data-base has been moved from the LIBRIS IBM system to the local GEAC system of Stockholm University Library, where it is handled according to all the now existing GEAC programme modules, it is tempting to see that as a feasible alternative for the whole data-base and the whole system. It goes without saying that this is as true of any good turn-key system with sufficient capacity, as of GEAC.

The main line of approach of the LIBRIS IV group, however, is to consolidate the present IBM performance of LIBRIS, reinforce existing programme modules, complete already started software additions, lay a very strong emphasis on communication problems, and see what will happen in the future.

As I said before, the local equipment which communicates with LIBRIS is about to be replaced by new hardware. There is a general agreement that it is therefore very timely to cut the ties to the 3270 emulation and also to the very large repertoire of characters handled by the MIKKO concentrators. The idea is that the present computer-terminal communication will be replaced by means of a protocol machine with a computer-to-computer communication. The new LIBRIS terminals will then all be personal computers provided with communication software functioning according to ISO:s OSI model and/or, at least to start with IBM:s communication module LU 6.2. This communication software will also permit transfer of data files online without interrupting the ordinary interaction and also allow connection to public data communication according to protocols like X25,X21 etc. Here I should add that the Swedish research libraries, which have already operational local systems, are using a safe but rather clumsy way of updating them. We still do cataloguing in the LIBRIS database and update our local databases weekly by reading into them a tape with the latest catalogue records.

When the LIBRIS IV work started there were some who nursed the ambition that the LIBRIS concept should comprise not only the central system with the central data-base and the network but also the local systems and applications at the border of the network. Even if there is still a lot of sympathy for such a view most people are aware of the fact that development has gone too far and too fast to make it very realistic. I have already described the great variety of different local applications around LIBRIS. It is still an open question what is going to happen on the local level and how this will affect the whole system. The most radical forecast of LIBRIS future development gives a very low estimate of the LIBRIS data-base and network. Maybe - spokesmen for this attitude are saying - the communication of bibliographic information will not use the starlike network to reach the LIBRIS centre, but choose a ring-net connecting the different local systems and their data-bases. Catalogue support can be provided by MARC record information on CD-ROM, perhaps the Swedish university datanet, SUNNET, and the remaining tasks of LIBRIS would be to collect the information for the Swedish national bibliography and to act as a switchyard for interlibrary loan requests. This view is based on the assumption that communication between computers in the future will take place swiftly and smoothly, without any complications whatsoever.

What impact the new CD-ROM technique will have on LIBRIS is another open question. I is obvious that it would be possible to distribute the LIBRIS data-base on CD-ROM instead of doing it online, at least for purposes where continuous updating is not needed.

Anyhow, during the LIBRIS IV work two kinds of development have been followed, namely the steady improvement of the existing system, and the drastic transformation of the system into something quite new. As something between these two extremes, you could perhaps say, in the transfer of the data-base from the present IBM environment and software to some other, already existing hardware and software.

Under any circumstances regular maintenance and minor improvements will take place. But any changes of a more radical nature will certainly have to wait until the organizational problems around LIBRIS have been solved.

The LIBRIS IV group stresses the importance of keeping the responsibility for operations as well as development together. In consequence we have suggested that the responsibility for development should be moved - together with some financial resources - from the DFI to the Royal Library.

Another, governmental, committee has just finished its task to draw up the outlines for the new state body which will replace DFI. It has accepted the idea that operations and development should go together, but it suggests that the total responsibility will rest with this new body. It is then up to the new body to have this responsibility undertaken by someone on contract and under the direction of a steering committee. The executive body could be the Royal Library, but that is by no means self-evident.

This much is certain, that a radically new development of the LIBRIS system will have to wait until the situation is clearer. There is an obvious risk that changes in the organization structure will slow down the LIBRIS work so that it will remain in the melting-pot for quite a time. Meanwhile, the many users - in the first place librarians at the more 20 libraries now cooperating in the LIBRIS network for whom LIBRIS has become a totally integrated and indispensible part of their daily work - may find some comfort in the fact that LIBRIS is, generally speaking already with present shape, a fairly stable and dependable system, not so badly suited for its purposes.

SIEMENS AND LIBRARY AUTOMATION

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SIEMENS AND LIBRARY AUTOMATION

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Abstract

Electronic data processing was introduced in the library of the newly-founded University of Bochum between the years 1964 and 1966 under the auspices of Professor Pflug and in cooperation with Siemens. Its introduction marked the advent of library automation in Germany and in Europe.

Siemens worked hand in hand with the libraries and was able to influence automation developments. Siemens was instrumental in developing many customized solutions for the library sector, and indeed many innovations in the earlier years of data processing derived from work in this area.

Mainframe library software was written to keep step with ongoing changes in the hardware environment. Since the System 3003 was installed in Bochum the market has seen the arrival of the System 4004 and the System 7.500 family running Europe's most widely used operating system, BS200. The spectrum of library software has expanded from the BIKAS offline catalog system of the late 60's to include the BVS online system for information and cataloguing, BIAS for library lending, and the SISIS concept which integrates the latest modules for library purchasing,cataloguing and lending. This concept is targeted at the Siemens PC family running the SINIX operating system, the Siemens derivative of the UNIX operating system. The software provided by Siemens has also been supplemented by non-Siemens packages.

In economic terms, developments in electronic data processing in the library sector in the Federal Republic of Germany lacked sufficient continuity and harmony to sustain a market which might have boosted innovation and investment.

The absence of economically available solution is the result of the failure to produce library automation standards upon which standard software packages could be built. Library software is tailor-made software, and as such expensive. The lack of standards can be put down to the widely divergent nature and organization of the library sector, and last but not least to a "librarian" mentality.

In the belief that librarians are beginning to think along more commercial and pragmatic lines, Siemens intends to continue cooperation with libraries and follow the path embarked upon in the Professor Pflug era - in the interest of the libraries and their users.

SIEMENS AND LIBRARY AUTOMATION

1. INTRODUCTION

With some trepidation, I drove on an overcast, rainy day in the autumn of 1963 from our office in Essen to Bochum. My destination was the Klosterbusch coal mine, the "command center" for the first project for library automation in the Federal Republic of Germany and in Europe: for the library of the newly founded University of Bochum.

Already fascinated by the possibilities of electronic data processing, I began work on the shared project with two visions:

- the dream of a master German catalogue, on the basis of the books stocked by the Deutsche Bibliothek, supported by EDP;
- the dream of a standardized automation system for all library activities, which would be adopted by all libraries.

At that time, I had great hopes for development of a new, standard set of rules: classification on the basis of the mechanical word order (1) (2).

2. THE DEVELOPMENT OF ELECTRONIC DATA PROCESSING IN SCIENTIFIC LIBRARIES

2.1 Electronic Data Processing

It is extremely interesting to compare the initial conditions of that time with today's facilities. The equipment for recording book loans was - quite apart from the fact that it was installed in a desk - a large piece of furniture with a large number of mechanical devices (see Figs. 1 and 2). Matched to these devices were the data media of the time, such as the Telcollecta badge for the user - this was as large as today's 256 Kbit chip card - and the punched tape card for book identification, which also acted as a receipt card (see Fig. 3).

Incidentally, Prof. Pflug was already, in this period, advocating the use of optical data acquisition methods!

The dimensions of this desk today easily accommodate powerful computers such as the multi-station personal computer PC-MX2 or the compact office computer C30 with the mainframe operating system BS2000 capable of executing 1.2 MIPS.

Let me, at this point, cast a look back at the development of the computer, using Siemens data technology as an example. As you can see from Fig. 4, this started in 1957 with the first mass-produced fully transistorized computer, the digital computer 2002. In 1963, the 3003 computer was announced as the first general-purpose Siemens computer. This machine was already capable of executing programs and peripheral operations at the same time. The main memory of the 3003 installed in Bochum had a capacity of 64 Kbyte - comparable with that of the System 4004, which was introduced in 1965. For comparison, remember that personal computers used for commercial applications today have a minimum memory size of 512 Kbyte, and more often 1 Mbyte, and can be expanded up to 8 or 16 Mbyte.

This has been made possible by the enormous advances in memory chip technology (see Fig. 5): In 1978, a printed circuit board the size of a postcard could, with 16-kbit chips, accommodate 64 Kbyte. In 1985, the same board could hold 1 Mbyte, today it holds 4 Mbyte, and by 1990 it will hold 16 Mbyte.

The advances in the processing power of the BS2000 central processing units is equally amazing and fascinating, increasing from 1 MIPS in 1977 to 65 MIPS in 1987, with 100 MIPS available in the near future (see Fig. 6). Another impressive factor in this respect is the development of the price/performance ratio.

As you most probably know, the innovation cycle for standard microprocessors is approximately two years. This means that the innovation cycle for computers is about two to three years. The operating system and the application software, in contrast, have an innovation cycle of 12 to 15 years! This, in turn, means that the time and money spent on software development and maintenance, on know-how, and on training of employees will be a good investment only if modern operating systems, running on compatible hardware, are used.

This aim of continuity has been followed since 1969 with the operating system BS2000, and the hardware has now attained a performance figure of 65 MIPS. In parallel to the general- purpose BS2000 computers, a range of office and compact computers has been developed, also using the BS2000 operating system, and their performance has kept step with that of the general-purpose computers (see Fig. 7).

With the same aim of continuity, Siemens AG is supporting the operating system SINIX as a second "mainline" parallel to BS2000.

SINIX is the operating system for desktop, department and communication computers, and is a derivative of the operating system UNIX. In spite of its restricted growth possibilities in comparison with BS2000 - at least in the immediate future - SINIX could become an attractive component in the sector of local subsystems. To close this brief summary of the system world, let me take a short look at the SINIX computers (see Fig. 8). They are a range of upward-compatible computers extending from the single-station system PC-X10 and the multi-station system PC-MX2 with up to 6 terminals, up to the MX 500 series, whose most powerful model, the MX 500-60, can be extended up to a configuration with 8 processors, 16 Mbyte main memory, 4 x 300 Mbyte fixed disks, and 32 display terminals. The innovation cycles mentioned previously will also show their effects here.

2.2 Library Automation

How long were the innovation cycles in the development of library automation? They were nowhere near as short as the hardware cycles and approached the software cycles, but this is understandable. As shown by Gattermann, there have been three development phases in the introduction of EDP (3).

The pioneer period, in the 1960s, was characterized by individual projects, each with the character of a pilot project. Bochum was followed by the University libraries in Regensburg, Konstanz, Bremen and Bielefeld. Although each of these projects had the same starting point - the main emphasis in each case being the processing of the large amount of cataloguing work resulting from large purchasing budgets - each solution was different and individual.

After these notable initial attempts, the automation efforts suffered a period of stagnation, without logical progress, in the early 1970s. This may have been due to a lack of stimuli on the part of EDP technology.

It is interesting to note that automation in the documentation sector made great advances in this period and even overtook the library sector.

It needed the idea of networks, first advanced in 1980 in a recommendation paper published by the Deutsche Forschungsgemeinschaft (4), to provide fresh motivation in the scientific libraries. Several such library network systems now exist. Mr. Habermann has already talked about this.

Without going into details of the lively discussions between librarians about the sense and purpose of network systems and how the work should be divided between these systems and the participating libraries, it is clear that the era of local subsystems has now begun and this is, to me, a logical step. It is the continuation of the library projects started in the 1960s, even if it is taking place in other organizational and technical surroundings.

The DFG recommendations for further development of network systems and integration of local networks (5) are a definition of the current trend in the development of EDP tools which favour automation at the local level:
- cheap but powerful computers in the form of office computers and personal computers
- efficient networks (LANs, WANs).

The local functions to be supported are evident, as they are the original, basic functions of the in-house libraries:
- purchasing, including bringing periodicals up-to-date
- recording of loans
- online user catalogue
- dissemination of information, e.g. access to databases worldwide

These functions must be defined in their mutual interactions, i.e. at the local level, and in their interactions with the network system. The basic principle of organization is to enter the data only once (cooperatively) and then to utilize these data as much as possible and necessary. The aim is not to create a single database for the various functions, as these would be difficult to use, but to support the transfer of data via interfaces between the various functional sectors. Wherever possible, this transfer should be automatic.

When discussing local subsystems, it should be remembered that the new technological facilities now make it possible for small and medium-sized libraries - such as church and public libraries, company, department and institute libraries, and special libraries - to automate their activities independently using their own devices. This looks like the start of a new development era.

3. ECONOMIC ASPECTS OF LIBRARY AUTOMATION

In 1966, at the end of a survey of the automation attempts in the German documentation and library sectors, Prof. Pflug said that there were no visible attempts to automate other departments than the catalogue and the lending departments, for example purchasing or periodicals. He then continued:

"The newly founded university libraries will probably be the first to develop new methods. However, it will be several years before a fully integrated data processing system is introduced into one of these libraries" (6). In the meantime, 20 years have passed, in spite of all the experiments and efforts!
I therefore think that it is pointless to go into details of software development - as I did for the hardware - at this point.

This depressing situation needs to be analyzed in more detail. As this subject is closely related to the question of economics of the library business, I would like to consider this aspect more closely. I would also like to take the opportunity to get some things off my heart, after more than 20 years of cooperation in the library market.

The economical cornerstones of any business are the costs and the returns. The latter are the product of the number of items sold and the price per item. Further important factors are the market potential, the competition, the willingness to automate, and the purchasing power of the users.

In the market for consumables, the price is the result of the enormous quantities; such quantities can never be achieved in special markets. In addition, the products for such special markets are characterized by special development which, in turn, is very costly. These costs can never be recouped via the price, due to the limited demand for the products.

In other words, in a special market with a "reasonable" market potential, such as the library sector, economic operation at an attractive price is possible only if the market resources can be fully handled with standard software which can be used universally.

But this, in turn, is not possible in the case of libraries. This is basically due to the structure and complexity of the various forms of library organization and to the existence of various types of libraries, but the librarian mentality also plays a part.

In order to clarify this point, I would like to quote Prof. Pflug again, even if it is slightly out of context. He rightly noted, in 1966, that the reconstruction which was necessary in many places was not accompanied by the introduction of new library working methods, and that the solutions the librarians were seeking for their problems were not determined by economical considerations. With reference to the widely discussed problem of duplicating titles for catalogue sheets, he said: "However, it was hardly possible to achieve a common agreement on the part of the librarians; even the prerequisite for such agreement was in most cases absent: there was not even a common language, which meant that the experts did not understand each other" (7).

This problem is just as realistic today, as are the following points:

- It is very difficult to give up an old, familiar form of organization, i.e. there is a lack of flexibility in adapting to new forms of organization, and that only in some areas.

- It is, I agree, very easy to first demand everything which looks good, and which other systems have, but it is very, very difficult to separate the important from the unimportant and to accept compromises. And if it is difficult to select one of two alternatives, then one simply demands that both are available, selectable at the touch of a switch.
- In the library sector, there are far more exceptions than rules.

- The librarian, with his fighting nature, acts virtually as the direct representative of the finance minister. It is one of the tragedies of the library sector that he has the lowest priority in the hierarchy of those receiving funds. In order to at least survive, he starts the paralysing circle: In order to get any funds at all, he applies for much less then he needs, only to see part of this small amount rejected - in some cases by higher-level library departments.

In spite of all this, and after 20 years of work, not always full of joy, my optimism with respect to the future of automation in German libraries remains unbroken.

Most of the energy was, and still is, needed to implement developments and investments internally, i.e. in one's own company. In a market in which activities do not result in a predictable sequence from a clearly visible demand, an infinite amount of persuasion is necessary to excuse permanent non-achievement of targets with the argument that there is still an enormous, though sleeping, market potential.

Let me, in the very difficult position in which both partners, namely you and the manufacturers, currently find themselves, search for common solutions which incorporate the technological innovations.

Briefly, I would suggest the following:
- standardization and concentration, instead of having more exceptions than rules
- a step-by-step concept, rather than a maximum solution
- modular solutions with interfaces, rather than total integration ("data cemetery")

- pragmatism instead of dogmatism

Finally, I would like to return to the keyword "modular solutions" and show you my idea of the scenario for scientific libraries, divided into functional levels (see Fig. 9).

Depending on the organization of the library, the local subsystem can be a central system in the sense of the central infrastructure or a multilevel system with more or less independent specialist departments.

Accordingly, the interfaces will have to be established over a wide range of levels. The tasks and functions of these levels have already been mentioned. Each PC workstation has the basic set of office functions, namely word processing, electronic mail and schedule management. I would also include the information transfer facility, i.e. access to internal and external databases, to the basic function set.

A series of such modular solutions are already available for the general-purpose computers running under BS2000 and for personal computers using SINIX.

I would like to mention only two such modules here:

- Catalogue information with the aid of GOLEM, i.e. the development of GOLEM into an OPAC (online public access catalogue) in the library of Düsseldorf University, as part of a DFG project

- The purchasing module SIERA for handling all purchasing tasks within the framework of our SISIS (Siemens SINIX Information Systems) concept, for use on the SINIX PCs

It has been a long way from the pioneering days, from the Pflug programs (see Fig. 10), to today. Under the sign of the owl, we at Siemens have done our best to make it as smooth as possible.

Professor Pflug, at the end of your successful career, I would like to present you, as a personal gift, with this owl as a reminder of our cooperation in working towards a common objective.

I hope that you will have many years to enjoy it.

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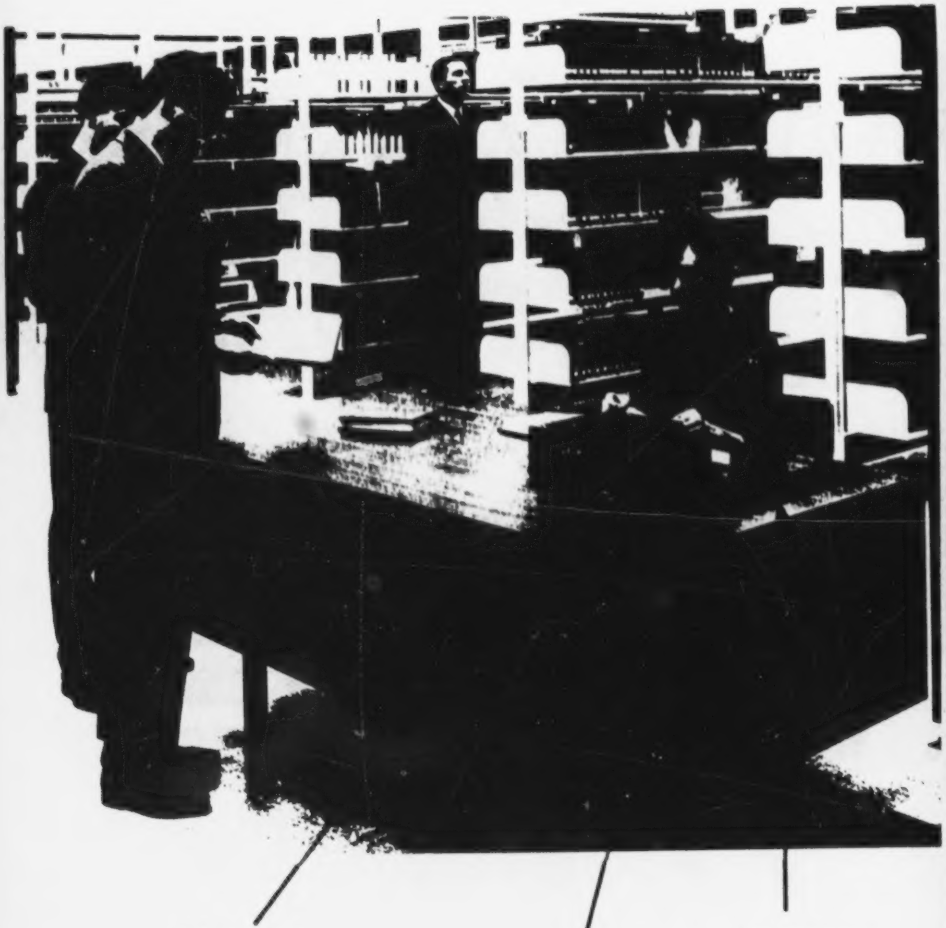
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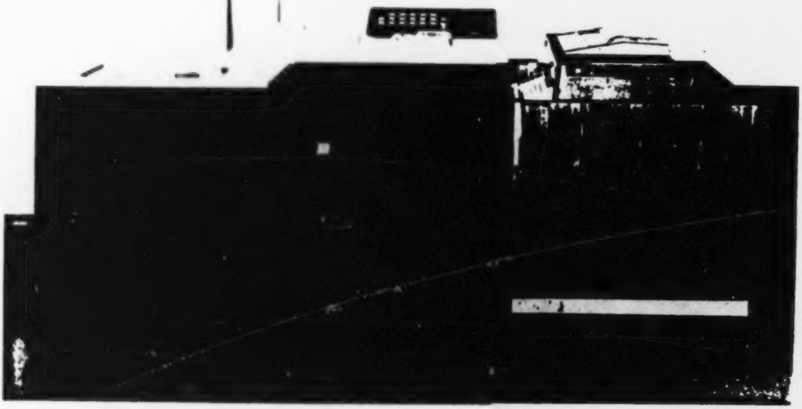

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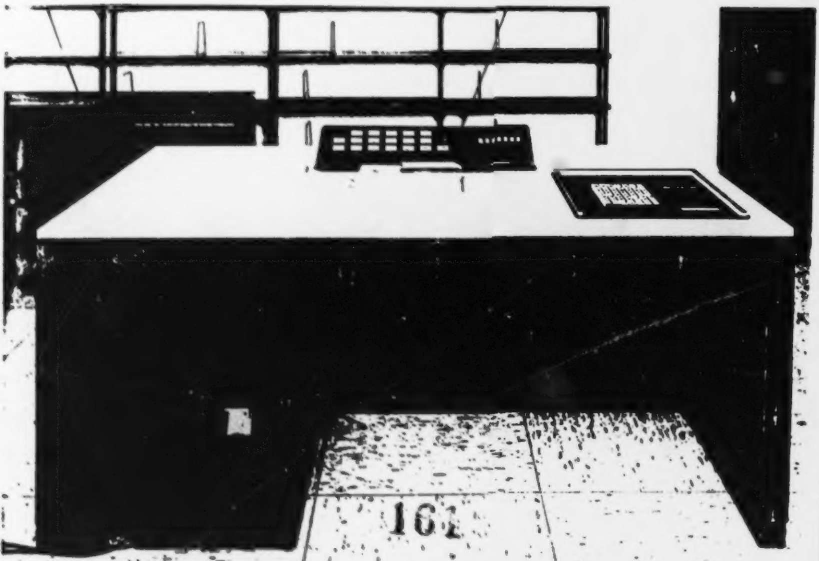

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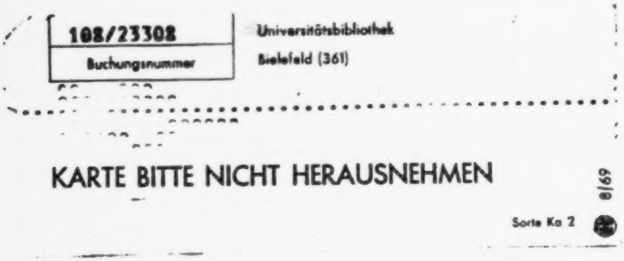

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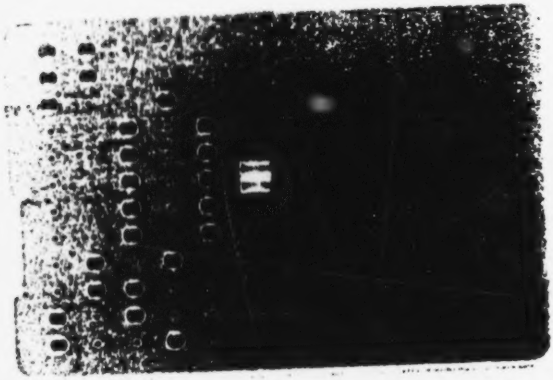

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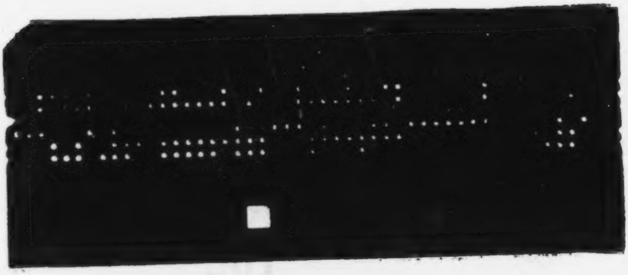
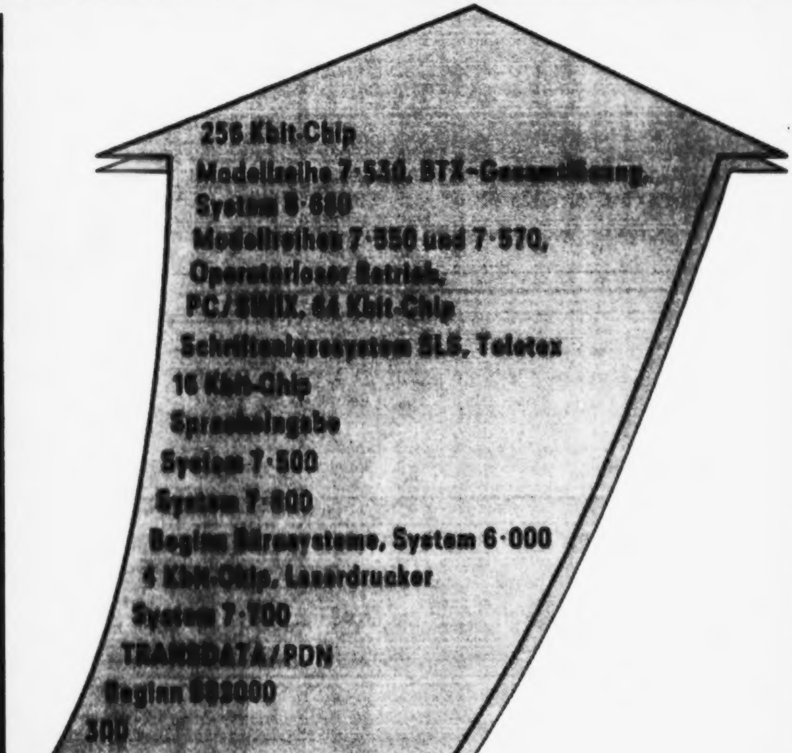


QUITTUNG FÜR AUSLEIHE


256 Kbit-Chip
Modellreihe 7·530, BTX-Gesamtlösung
System 6·680
Modellreihen 7·550 und 7·570,
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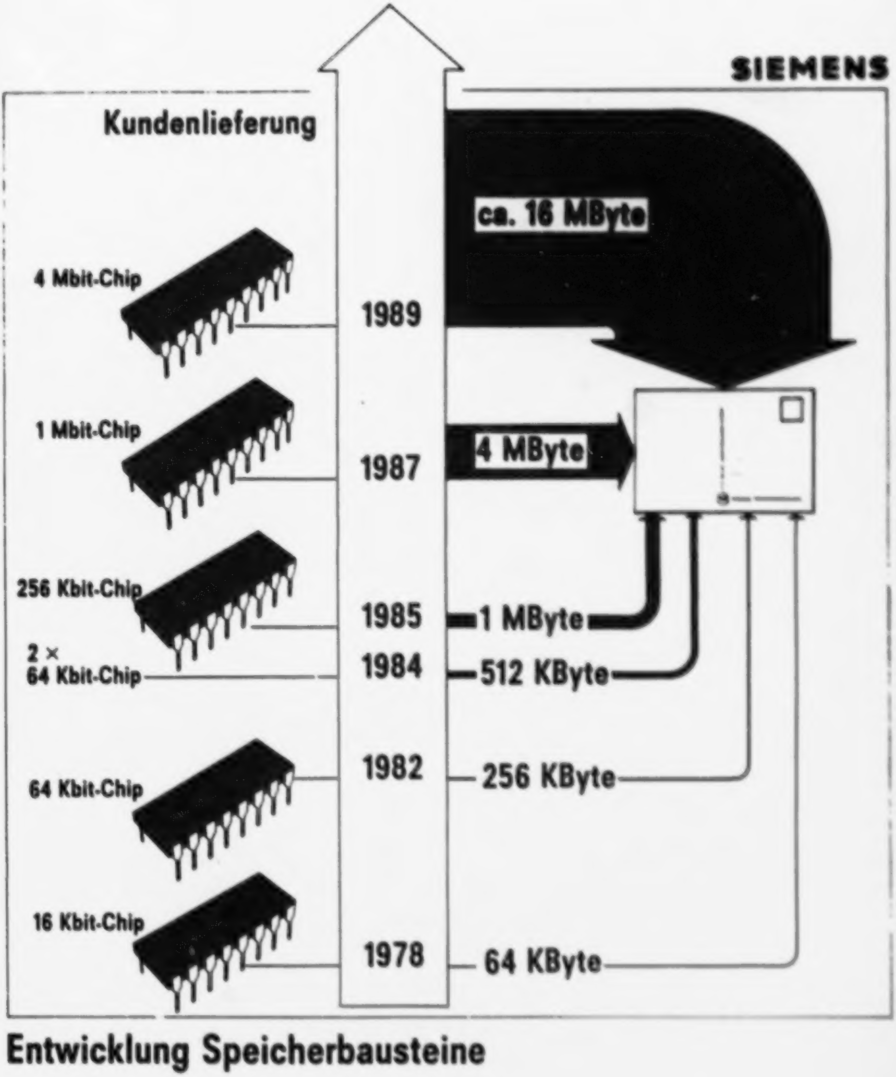
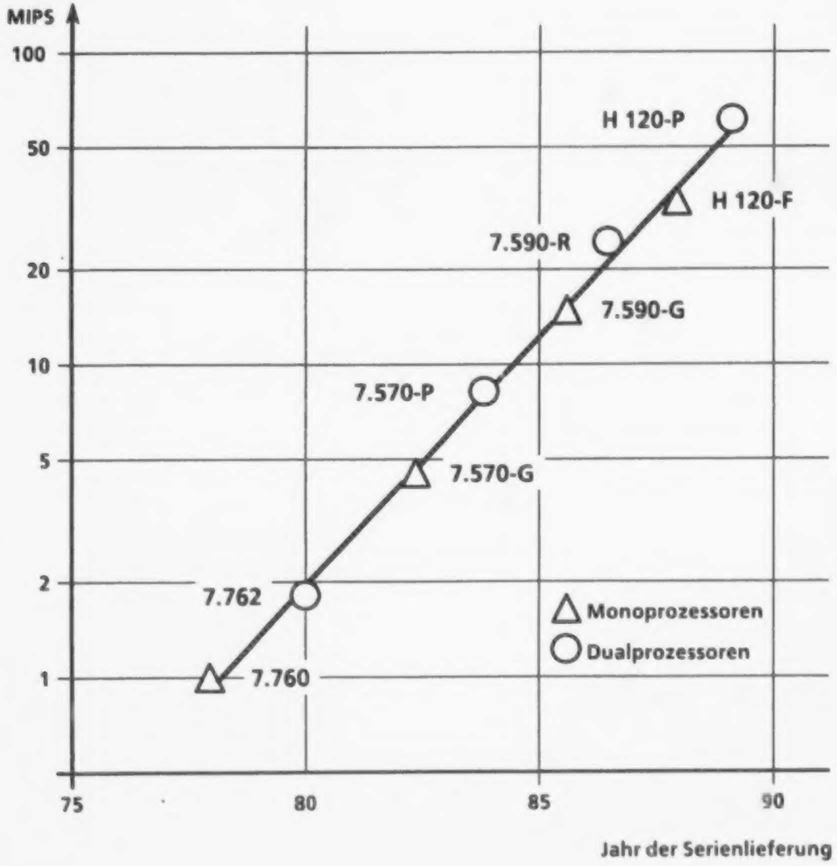
Schriftenlesesystem SLS, Teletex
16 Kbit-Chip
Spracheingabe
System 7·500
System 7·800
Beginn Bürosysteme, System 6·000
4 Kbit-Chip, Laserdrucker
System 7·700
TRANSDATA/PDN
Beginn BS2000
300
4004
3003
2002

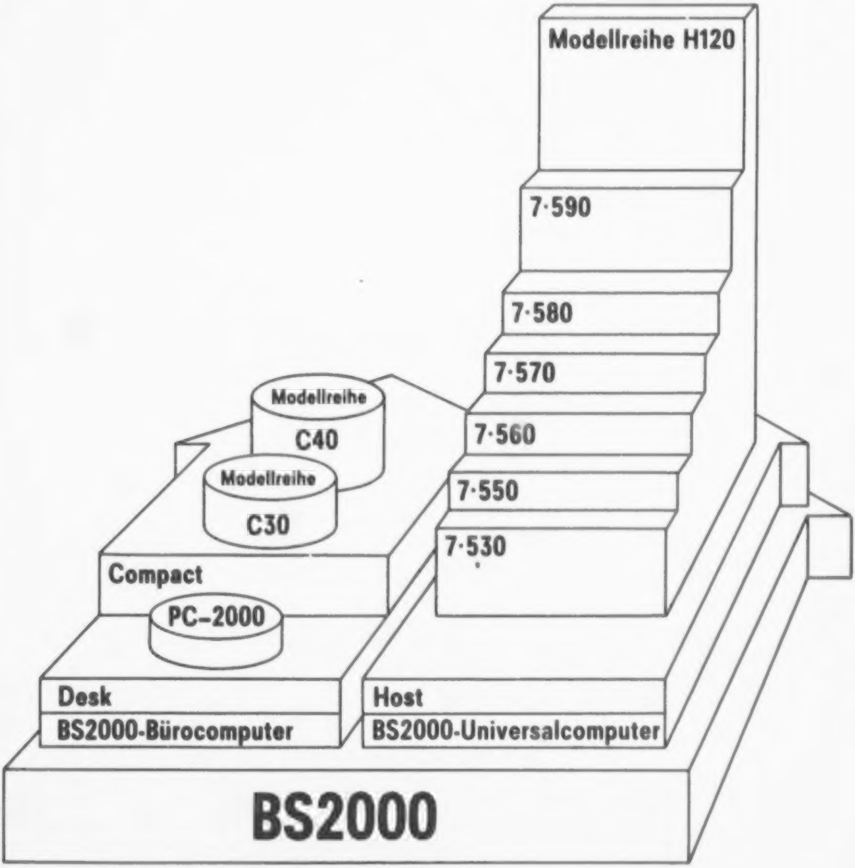

SIEMENS
Kundenlieferung
ca. 16 MByte
4 Mbit-Chip
1989
1 Mbit-Chip
4 MByte
1987
256 Kbit-Chip
1985
1 MByte
2 ×
64 Kbit-Chip
1984
512 KByte
64 Kbit-Chip
1982
256 KByte
16 Kbit-Chip
1978
64 KByte

Entwicklung Speicherbausteine



Leistungssteigerung BS2000

SIEMENS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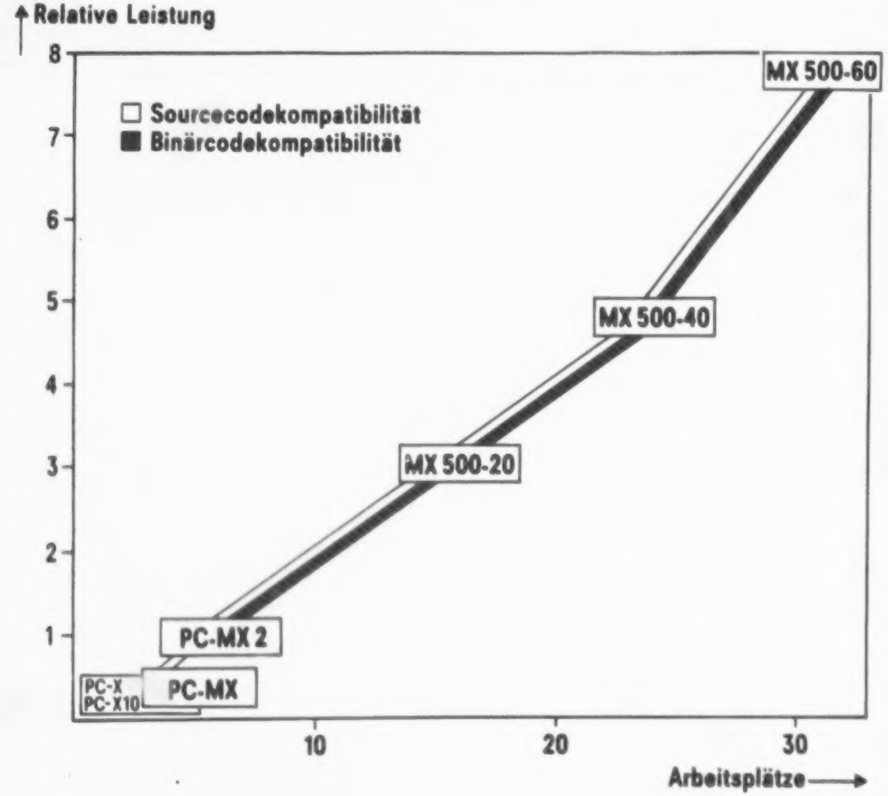
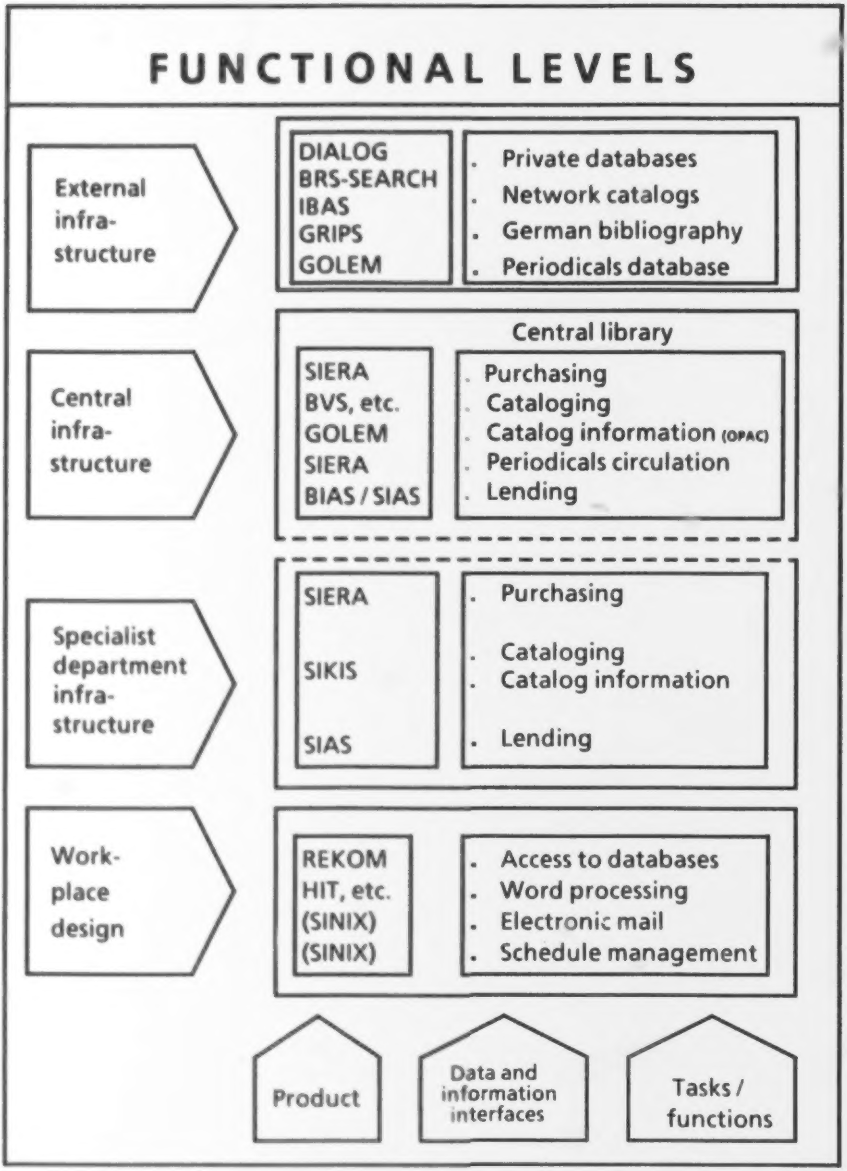
7·590
7·580
7·570
7·560
7·550
7·530
Modellreihe
C40
Modellreihe
C30
Compact
PC–2000
Desk
BS2000-Bürocomputer
Host
BS2000-Universalcomputer
BS2000

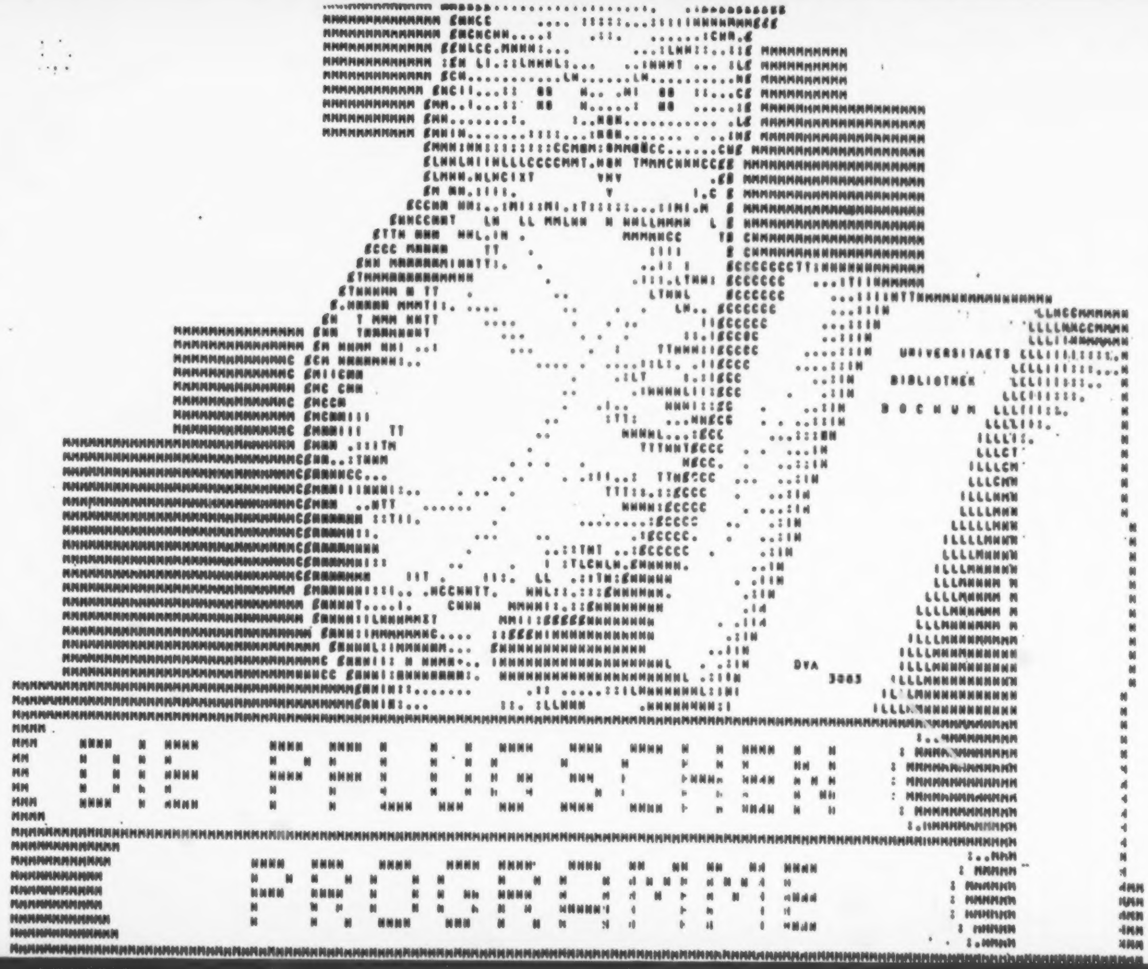
System 7·500
Die DV-Welt bei Siemens



Das Familienkonzept mit Binärcodekompatibilität

MX 500
SINIX-Familie


FUNCTIONAL LEVELS
External infrastructure
DIALOG
BRS-SEARCH
IBAS
GRIPS
GOLEM
. Private databases
. Network catalogs
. German bibliography
. Periodicals database
Central infrastructure
Central library
SIERA
BVS, etc.
GOLEM
SIERA
BIAS / SIAS
. Purchasing
. Cataloging
. Catalog information (OPAC)
. Periodicals circulation
. Lending
Specialist department infrastructure
SIERA
SIKIS
SIAS
. Purchasing
. Cataloging
. Catalog information
. Lending
Work-place design
REKOM
HIT, etc.
(SINIX)
(SINIX)
. Access to databases
. Word processing
. Electronic mail
. Schedule management
Product
Data and information interfaces
Tasks / functions


UNIVERSITAETS
BIBLIOTHEK
BOCHUM
DVA
3083
DIE PFLUGSCHEN
PROGRAMME

THE IMPACT OF TECHNOLOGY ON THE WORK OF THE SUBSCRIPTION AGENCY

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FAXON EUROPE
AMSTERDAM
THE NETHERLANDS

THE IMPACT OF TECHNOLOGY ON THE WORK OF THE SUBSCRIPTION AGENCY

JACQUES CH. GERMAIN
FAXON EUROPE, AMSTERDAM

Abstract

This century has been an extraordinary period for human society. We have experienced changes in virtually every aspect of our lives which have left us stimulated and optimistic about the future, and at the same time full of fear and confusion. Science, and its child, technology have driven those changes more than any other single factor.

The process of scientific discovery has accelerated at unbelievable rates. And the time lag between a basic discovery and its practical applications in human society has almost disappeared.

Because of its particular mission in the human society, the whole information industry has to be the first to implement the technology. As a consequence, we have a short period of time to move from a subscription agency to what we call at Faxon, the "knowledge broker". Knowledge broker, in other words is the primary vehicle for information which is needed by knowledge workers in their process of creation and discovery.

THE IMPACT OF TECHNOLOGY ON THE WORK OF THE SUBSCRIPTION AGENCY

The Fourth Information Revolution

The first technology in information is the spoken word. This was our first effort to create a record, or history of our experiences beyond the immediate moment of the experience itself. Human memory was our first library. But, of course, memory wasn't always accurate and was subject to confusion.

A more tangiblé method was developed to record and store information . Probably the first tangible records were knots on ropes. For example, to find out what a financial transaction had been people tied knots in ropes. The knots were portable and permanent over time, so that there were fewer arguments as a result of these tangible records.

Ropes and knots grew into symbols. Symbols grew into various languages and because the world, as a world, was extraordinarily isolated with very little communication, both in terms of physical as well as informational transfer on the global basis, these systems were highly isolated. Different languages, writing systems, and means of measurement emerged because people were living in isolation.

And then there was the third revolution, moving from the spoken word to written records. Languages, numeric systems, and record keeping were recorded on paper with pen - and enormous change in the way that our social system evolved. And then came the printing press. Before the printing press was developed in the 16th century, only three or four thousand books existed in Europe. Within fifty years of the development of technology, millions of books were available throughout Europe. Within the one lifetime, information suddenly exploded because of one specific technology that suddenly changed the face of our entire globe.

Even in the 16th century, people understood that information was infectious, that it was powerful and it had to be controlled. But the printing press made information control very different. No longer could you contain and control information, own it, privatize it in the way it had been previously possible. Information became a public matter, beyond the control of any one individual. With the printing press the technology for dissemination of information became public, rather than private domain.

A Faxon sales representative for Latin America recently said, "You know, democracy is good for Faxon. I've noticed that when a country goes from being a military, totalitarian country to one that is open and democratic in its structure, Faxon gets new orders. The information begins to flow into that country in a way that was not true before".

The Tools of the Fourth Revolution

Today we are faced with a fourth revolution. What are the basic tools of the fourth revolution? Essentially, it is the process of converting information, of virtually all kinds, to binary codes comprised of series of zeros and ones. Pictures, sound, movement, text - all are converted to digital forms which are then susceptible to extraordinary manipulation and transmission. The magnitude of these changes is difficult for any of us to comprehend. Today, commercial systems are available which store a gigabyte of information, the equivalent of 60,000 - 80,000 pages of text, on a 12" optical disk platter. And it's only the beginning.

Scientists now claim to have condensed digital memory to what they described as the molecular level, providing as much as one gigabyte of information on a square centimetre. That is the equivalent of 60,000-80,000 pages of text - on one square centimeter. The cost of such information storage and retrieval systems is dropping dramatically so that within the next few years, $ 30,000 to $ 40,000 systems will easily be able to store and retrieve the equivalent of a substantial research library.

There are, of course, many unsolved technical issues, but the basic technology needed for this fourth revolution in information is already in place and much of it, already in the market. Within this decade, we will have information storage and retrieval systems that will make it technically possible for just about anyone on the globe to have access to just about any information, using hardware that is extraordinarily inexpensive.

The system will be FAST. The information will be available in effect instantly on a global basis.

The system will be CROMPREHENSIVE. Any information to which the user is qualified to have access will be available in a comprehensive global information network.

It will be highly RELIABLE. Access will be available to what is essentially the original material, data, etc. Photographs, for example will be digitized in their original form and will be accessible for further examination and study in their original form.

It will be FRIENDLY. The access systems will be designed to meet human requirements. Systems will be voice and touch controlled, interactive and intelligent. Search and retrieval experience will be one of intelligent discussion that is cumulative and meaningful. The systems will be portable, customized, and not only will provide what you ask for, but will enable you to scan broad ranges of information easily and efficiently, somewhat like the front page of the Wall Street Journal. Flat foldable screens will fit into your jacket pocket. Hard copy will not disappear, but will be generated at high speed, on demand, at the point and time of use. Therefore, in an information-hungry world, there will be much more, rather than less, printed paper.

Recent Trends

How will the entire information network, from creation to use, change over the next decade? Only by addressing this question can we address the more immediate question of facilities planning. Following is a summary of eight trends which, we at Faxon, believe will shape the information industry in the decade ahead.

1. Acceleration of change.

The first trend that we observe is that nobody knows, in fact, what's going to happen over the next decade in information systems. What we do know is that the rate of change is almost certain to increase, particularly because of the impact of new technologies upon, not only information systems, but our production systems, our communications, our entire lives. It's hard to imagine any area of our lives today that will not be profoundly affected by new technology. So, we are in a situation of, as Howard Raiffa, a Professor at

Harvard Business School, likes to call "decision-making under conditions of uncertainty".

2. Transformation of labor.

Next, we see in the United States, a nationwide shift in the labor market. This is not a short-term phenomenon; it's a long-term, technology-driven shift. The number and skill level of production workers is clearly going to decline. Because of automation and robotics, as a nation we will need fewer and fewer manual production workers in the years ahead. Service workers will be in increasing demands.

In the area of information workers, I would like to identify two types of workers because they'll be effected quite differently. So-called data workers, those that are involved in the processing of numbers or data, will disappear rapidly as automation and technology assumes the data-worker function and eliminates those jobs. Knowledge-workers, on the other hand, defined as those who are engaged in the process of creation, discovery, and learning, will increase in demand significantly. The real growth in the economy will be affected by the quality and number of the knowledge-workers available within the social system.

So, the labor market will change permanently, in ways that will not return to the "good old days". This will have major implications on the university, particularly on its role of producing and sustaining knowledge-workers. Because learning will be a life-long process, mid-career development, retraining and upgrading of people so that they can continue their process of creation and discovery will become a major role for the university and the educational system.

3. Segmentation of knowledge

The third trend is differentiation or segmentation of knowledge. Information, as a field, is becoming increasingly complex and it is no longer, if, indeed, it ever was, appropriate to deal with information as if it were one dimensional. There are many different kinds of information, they behave in different ways, they have different values, different uses, and for us to continue to use the term "information", or even the term "library" as if that refers to some unitary concept, is misleading. The process of differentiating the functions, values and use of information will continue in the decade ahead, and that has implications for your question.

We're going to see more and more specialization. We can expect to see centres of specialization, knowledge centres, that focus according to particular needs of the workers within the university, whether they are professor, faculty people, or people from outside coming in to use the university facility. As the notion of the "invisible college" takes hold, specialized information centres organized around a given subject in a distributed information network, rather than a single concentrated central facility, is one strategy to consider as a facilities planning strategy.

4. Digitization of Information

Gradually, but surely, information will be converted to a digitized format in the 1990's. The shift will be uneven across different types of information. Economic value and stability of data will be key factors in determining rate of conversion and mode (on-line or optical disc). It is important to note that this is not going to happen overnight-especially in the arts and humanities. Medicine will move quickly, science and technology not far behind.

Further, we will witness substantial reductions in the cost of data storage and computation. Microcomputers, the revolutionary tool of the knowledge worker, will access distributed databases, especially with optical discs. The distributed networks will not replace central databases and network systems, which will expand at least the same rate as distributed systems. Hybrid systems involving distributed storage and processing and printing on demand networked into institutional and global networks will evolve over course of the decade, changing substantially the way knowledge workers work.

5. Expansion of services.

There will be an increasing demand for educational services, particularly mid-career services, throughout the decade.

Within the area of information services, the increase in sources of information and in the number of people dependent upon information for their work will lead to increased demand for value-added information services, such as information analysis services which search for and summarize issue-related information for a client.

6. Compression of events.

People, and the entire social system, will require faster response time than we have ever before imagined. So, the speed of response between the request for a service and the delivery of that service will shorten dramatically. Again, that has implications for the kinds of services and facilities that we need to plan for the decade ahead.

7. Globalization of networks.

Technically we will make it possible in the decade ahead to have enormous quantities of information in a small amount of space at one worker's workstation, at one professor's desk, or one student's carrel. Human beings, however, such as we are, thrive upon and require communication. We require connections with each other, and the technology that permits those connections to occur over broader geographical bases and around subject matter interests will increase. The topics, interests, and the segmentation of interest will become increasingly important. National boundaries will become less important as people with common interests learn how to connect with each other, irrespective of the geography, across institutions. And so that thrive, for push, for more communications and more networking, is a long-term trend.

8. Evolution of institutions.

Finally, knowledge-based institutions are evolving in ways that blur the distinction between non-profit and for-profit enterprises. They are becoming more alike, and less distinguishable, commingling their efforts. One can feel good or not good about that. But it's a clear trend and one that I expect to continue over the decade ahead. The merging of non-profit and for-profit institutions has important implications, not only for libraries, but for the university system as a whole.

Summary

To summarize: it is obvious that the fourth information revolution will change rapidly and drastically our work, but not our mission. We, as knowledge broker, and you as librarians, with the potential to become chief information officers, in charge of data processing centres, records management, archives, communications, telephone systems, data communications, networks, we should make sure that we have a clear sense of our mission and that we understand our clients well and let their needs drive our services.

In order to prosper in the role of the CIO (Chief Information Officer) we must be open to new ideas. We will have to stretch ourselves and we're going to have to take some risks. We need to focus not only on the users of the library, but on the users of information within our system. What they need, who are they, what are they like, what are their needs in term of response time, in what form do they need the information? We need to become experts on our user needs.

Information is central to the process of transforming our society, there is no set outcome. The way the future will evolve, the role of information, its accessibility, the way it plays itself out in our personal lives will be greatly effected by the decision that we make in the years ahead. Change is inevitable, it's up to us to make those decisions and to do it now.

1. The Fourth Information Revolution
2. The Tools of the Fourth Revolution
3. Recent Trends

Fourth Information Revolution

* Fast

d

* Comprehensive

* Reliable

* Friendly

Recent Trends

1. Acceleration of change
2. Transformation of labor
3. Segmentation of knowledge
4. Digitization of information
5. Expansion of services
6. Compression of events
7. Globalization of networks
8. Evolution of institutionsw

MIKROMARC - LIBRARY SYSTEM FOR THE PC

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1DDJMIKROMARC - LIBRARY SYSTEM FOR THE PC

VIDAR INGEBRETSEN
NORSK SYSTEMUTVIKLING AS, OSLO

Abstract

Mikromarc is a library system for the IBM-PC and compatible which runs under MS-DOS:

Mikromarc was originally (1979/1980) a project at the university library of Oslo who needed a simple program for registration of Marc-records to be stored in a retrieval database (UBO:BOK) on the DEC-10 mainframe. In about 1983 BRODD converted the program to IBM-PC. It was then a system for registration of MARC-records and production of cards and listings. It had no search-possibilities.

The 1983-system had about 10 users. Upon request from the users, BRODD started in 1986 developing an ONLINE-version. The first version was ready in January 1987.

The third version (Sept. 1987) consist of:

- Full screen cataloguing. The screen may be adjusted accordingly to the users needs.
- Online searching. Both words and the entire fields are searchable. The libraries may themselves decide which fields should be searchable. Uses CCL.
- Import and export of data.
- Production of lists, cards and bibliographies.

By end of August the second version has about 15 installations in Norway. In Sept. it will be installed in Denmark and later on converted to English and German.

The presentation will focus on experiences using a PC for bibliographic data, possibilities, advantages and limitations.

MIKROMARC - LIBRARY SYSTEM FOR THE PC

1. HISTORY

Mikromarc started as a program for registration of MARC-records in 1979-1980. The records were uploaded into UBO:BOK which is the database for the University of Oslo.

In 1983 the system was converted to IBM-PC and further developed by BRODD. It was a low ambiguous system. It contained programs for production of lists and cards. There were no searching and no editing. The system had about ten users and was in use until 1987.

Upon request from the users BRODD started the work with an online version in 1986. The first version - the "pilot" version, was ready in January 87. It contained online searching using CCL and full screen editing. The system contained a lot of errors, but it was a necessary step in order to obtain knowledge. It was mainly used by the old customers.

In June came the second online version which was an improvement from the first. It had less errors and more functionality. In August the system was taken over by Norsk Systemutvikling A/S.

In October came the third online version. The system now started to look commercial.

By spring next year the network-version with an DDC-chainindex and circulation will be ready.

The system will be marketed in Denmark by RC-Computer.

2. THE SYSTEM

The system consists of the following modules:

- Cataloguing
- Online searching
- Import & export
- Production of reports
- Production of bibliographies
- Production of catalogue cards

The system is based on the MARC-record.
The records are edited on a full screen base. The screen may be adjusted to fit the users need. All MARC-fields may be entered and the most used fields given special screen fields.

The searching is based on CCL. All parts of the MARC-record may be searchable, words or field-based. The search-entries may be selected by the user.

The system may import data from the major bibliographic databases in Norway thereby making it possible for a small library to download frequently used references into a local database, which also makes it possible to avoid double cataloguing.

3. BASIC REQUIREMENTS

The system has a high degree of flexibility. This is because it may be used by so many different libraries, from small public libraries to special subject libraries all with their special needs.

The system is easy to use. There should not be spent too much money on training etc. since the system has a low price and money is taken from low library budgets.

It must be datacompatible with larger systems. Only that way may the data be downloaded into the local database and uploaded into the mainframe.

4. CURRENT STATUS

The users may be divided into two major groups:

- Public libraries, 6 users.
- Special libraries, 20 users.

The system is used for several reasons:

- As an intermediate system.
- For educational purposes.
- As a tool for the librarian.
- Stand alone system.
- Production of bibliographies.

5. ADVANTAGES USING PC

The PC has several advantages compared with larger mainframe computers. First of all it is the price.

Furthermore, it has good and fast user interface. The traditional terminals use a communication line to the mainframe. The speed is usually 9600 bits/sec. This causes slow updates on screens and frustrations for the user. It takes practically no time at all to update a screen on the PC.

Starting with a PC for automation in a library causes low impact on the library organization compared with a large system. The PC is just placed on the librarians desk, nobody notices that.

6. LIMITATIONS USING PC

Of course there are some differences using a PC from a larger system when it comes to storage capacity etc.

Another problem is that the library may not have a computer-operator available, thereby causing frustration when everyday problems occur.

7. FUTURE PROSPECTS

The PC's are becoming more and more popular as the prices are going down in the same ratio as performance is going up. In short future we may expect the libraries to prefer PC-networks instead of larger mainframe systems. The storage problem may be solved by the low price, and rapidly increasing capacity hard-disks, together with increasing flexibility of operating systems. The traditional mini-computers will be squeezed out of the market. Within the end of the century, the PC's may exist in every library.

CD-ROM IN THE LIBRARY
IT'S MORE THAN THE FICHE OF THE 21TH CENTURY

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CD-ROM IN THE LIBRARY
IT'S MORE THAN THE FICHE OF THE 21TH CENTURY

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Abstract

The University of Guelph is one of the first academic research libraries to provide CD-ROM access to the resources in it's collection.

Potential applications of this new-to-libraries technology will e discussed with specific reference to our experience so far, including some end-user rections.

CD-ROM IN THE LIBRARY
IT'S MORE THAN THE FICHE OF THE 21TH CENTURY

CD-ROM IN THE LIBRARY

This paper describes the application of CD-ROM (Compact Disk-Read Only Memory) technology in the University of Guelph Library. But first a brief outline to indicate how the library was already in a position to be able to introduce this powerful new technology when it became available in 1985-1986.

The University of Guelph caters to some 12,000 students and comprises seven colleges, including the Ontario Veterinary College, and the Ontario Agricultural College, both well over 100 years old. The first, for historical and practical reasons possesses the only branch library in our centralized system. Basically the University has a subject divisional library with direct open-stack access by users. A leading and distinguishing feature of our library has been the avant-garde introduction of automated computer systems for information retrieval and collection control.

In this realm, previous developments in historical order have been:

1) early cataloguing and circulation using automated, batch processing systems (in the mid-1960's and early 1970's)

2) participation in the development of the Canadian online service (CAN/OLE) as a test site in 1971/72

3) introduction of a computerized circulation system in 1976/77 that permitted online retrieval by title, author or call number, of any item in the circulating collection

4) in 1977/78, terminals to permit public access were located in all subject divisions, with the University communications network facilitating access from terminals remote from the library

This system provided inventory control since displayed information told whether a volume was in library' or, if charged out, its due date, and permitted personal booking of the volume on its return

5) In the early 1980's, the library participated in the field and market trials of Bell Canada's iNet (Intelligent Network) service as a member of the Bibliographic Information Group (at the invitation of and headed by the National Library)

6) the next, in 1982/83, was a computerized online catalogue system that permitted searching the total collection by author, title, call number, and subject (Library of Congress Subject Heading and Title keywords). Again the University communications network permitted access to the collection from terminals or computers throughout the campus. The final result of this installation was disposal of the library's card catalogue; back-up in the event of a computer failure was provided by COM fiche catalogues, generated from the database at regular intervals.

At the same time as all these practical applications were being incorporated within the library system, we were continually monitoring developing technologies with a view to their potential usefulness and to ensure that our thinking and planning activities were moving in complementary patterns. Very little of our development could have taken place successfully without the contributions from and active participation of *all* the library staff members.

In 1985/86, CD-ROM technology emerged in the database marketplace when, as happened with tape in the 1950's, the computer industry adopted a storage medium designed for audio recording. The development of CD-ROM devices is bringing very large databases into the cost effective range of personal computer owners.

Indeed, CD-ROM might well have been developed for use in libraries, because of the many practical advantages it offers:

- very large amounts of data can be stored in a very small physical space
- disks are relatively inexpensive to duplicate in large numbers
- compact disks are robust and reliable

- they can be used in many locations
- the accompanying search programs provide superior access to the bibliographic database.

The University Library, faced with the problem of maintaining a very large bibliographic database and providing access to a large and active user community that is becoming increasingly computer literate, realized the potential economic benefits (as well as those for retrieval of information) offered by the new medium.

As a pilot project to evaluate CD-ROM, the library is replacing the microfiche back-up to the online catalogue with micro-computer search-stations equipped with the entire bibliographic database on a CD-ROM.

There are at least two important benefits of the CD-ROM over microfiche. First, while not everyone has access to a personal computer, there are considerably more micro-computers on campus than microfiche readers. The multi-purpose nature of the micro-computer has made it an ubiquitous feature in almost every department and administrative office; the recent decision of the University to open a sales and service office will increase their use by individuals, including students. Thus, there is an already existing equipment base on which the dissemination of a CD-ROM catalogue can build. Second, the disk catalogue is not merely a copy of the microfiche catalogue in another high-tech medium. The CD-ROM search program provides for superior access to the bibliographic database which is the heart of the library system, and permits for the first time ever, direct access to all the information that once appeared on the catalogue cards.

Searching the Database

The CD-ROM contains records for all catalogued or coded items in the collection: books, monographic series, periodicals, government publications, maps, theses, audio-visual material (film, etc.), scientific and technical research reports, and archival and special collections. The complete database of approximately 800,000 records for over 1.5 million equivalent volumes, as well as all the associated indexes, is stored on one compact disc. Access is provided by several different indexes which allow searching by title, author, call number (or other numeric data), LC subject heading, and keywords or keyword combinations.

These are the same access points provided by the online catalogue. However, the CD-ROM goes beyond these, and permits searching by material type and by location. The results of a subject search, for example, could be restricted to a specific type of material (films), or to items held in a specific location (archives). The CD-ROM also provides an 'everyword"index, which, as its name implies, contains an index pointer for literally every word (and number) in each and every record of the database. In any search, the standard AND, OR, and BUT NOT Boolean operators may by used to combine terms from any of the indexes into a search (or keyword) string.

The search program segments the monitor screen into three parts. Similarly to many other microcomputer-based products, the bottom strip of the screen is a 'help'area defining the current actions performed by the function keys. The remainder of the screen is divided vertically onto an index display area and a text display or work area. Once an index is selected, the index area display becomes a 'word wheel', an alpha-numerically sorted list of the entries in that index. The total number of records in the database containing the index entry is displayed beside each item.

The user builds up a set of desired records by selecting indexes and then by selecting and combining terms from these indexes. The selected terms and their inter-relationships are displayed in the text or work area of the screen, and the search terms and/or strategy may be modified at any time. The user can display search results using one of the function keys. The amount of information displayed for each record has been a chosen to include those fields most likely to satisfy the average user most of the time. However, the output display can be tailored so that any desired combination of fields may be included.

Because of the nature of CD-ROM, the data cannot be revised or the disk updated. Each ' edition' requires creating or mastering new disks, and the current cost of production limits the frequency of mastering. Thus, the CD-ROM catalogue can never be as up-to-date as the online catalogue.

How does the CD-ROM based catalogue compare to or complement the online catalogue? One major advantage of using a disk catalogue in a single-user search-station configuration is that very powerful search protocols can be developed and run without impacting on other users. Since each user accesses the entire database with the facilities of one stand-alone microcomputer, the allocation of processing cycles is not significant, as is the case in a multi-user environment. Response time becomes very predictable, and better, on average, than it is in a shared resource architecture.

The relatively low incremental cost of CD's allows increased distribution of the library's database on a much larger scale than is now possible. Without decreasing response time to the local academic community, we can now provide access to the library's database simply by distributing disk copies of the catalogue to libraries and other interested organizations and individuals. Processing cycles will not have to be rationed, nor will we incur concomitant expenses by increasing access to the online database through standard telecommunications links. Copies of the CD-ROM catalogue have already been sold to several Canadian universities and to some American institutions offering Canadian studies programs. Individual faculty members or departments may also request copies for their own use.

Future

The next stage of development is to increase the number of search-stations within the library, and then to link the CD-ROM catalogue data to the current status information collected by the acquisition and circulation systems. At the same time, there is a need to provide access via the campus communication network (a Rolm data switch). Present thinking suggests that the latter will be accomplished by dedicating a set of search-stations (without monitors or keyboards) to Rolm ports. These stations would receive calls routed to them by the Rolm switch. Nowadays, students may use clusters of microcomputers or terminals in the library, or in the various colleges or departments; in some disciplines, students are actively encouraged to acquire personal computers. As well, all telephone sets in the students residences have the capability to link a terminal or personal computer to the campus network.

As the phased development proceeds, we are looking to linking public access search-stations to additional information resources. Each search-station would be connected by a local area network (LAN) to a centralized file server which holds current status information for each item in the catalogue. Upon request, the searcher could then view the current status of any item selected from the database. By adding database servers to this configuration, the library patron using the same search-station could access other databases provided by the library system - the possibilities are very exciting!

Conclusion

CD-ROM can not only be used as a back-up medium for an online catalogue, but indeed, linked to supporting resources, it could become a primary vehicle for providing 'online'catalogue access since it provides superior retrieval, guarantied performance, excellent back-up and redundancy at low incremental cost.

Acknowledgements

It should be clear that activities herein described depend on contributions and participation from the entire library group, and the support of the University administration and community. The favourable climate to foster development results from the leadership of Margret Beckman (Chief Librarian until 1984, and now Executive Director for Information Technology for the University), and John Black, formerly Associate Librarian and now Chief Librarian. Specific additional thanks to George Loney, Staff Analyst, for supporting diagrams accompanying this presentation; to W.B. Pearson for editorial assistance, and to Jeannette Davidson for manuscript "production".

UPDATING OF ONLINE CATALOGUE ON CD-ROM?

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DJUPDATING OF ONLINE CATALOGUE ON CD-ROM?

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Abstract

Traditional OPAC's are using mainframe computers allowing online access via direct terminals or local networks. It is discussed, if it is possible to supply almost the same service by a local CD-ROM-catalogue-system. The aspects of data preparation, updating, networking, technical handling, size of the database and prices are considered. With view to the technical characteristics of optical disc in the CD-ROM-version the competition to a traditional OPAC in updating services will be difficult. Technical possibilities for a solution are shown.

UPDATING OF ONLINE CATALOGUE ON CD-ROM?

"CD-ROMS were pretty new for libraries in 1986 - and still are, of course. (The Editor of 'The Electronic Library' in the June 1987 issue; 1)

1. The taximeter syndrome

This term is not yet a traditional professional term but might become one. It is a precise and short definition of a phenomenon which is often observed with online users. The term has been created for this phenomenon by Betty Steiger, President of IIAA. The meter runs during an online search and this is changing both user habits and costs (for user and for machinery/networks).

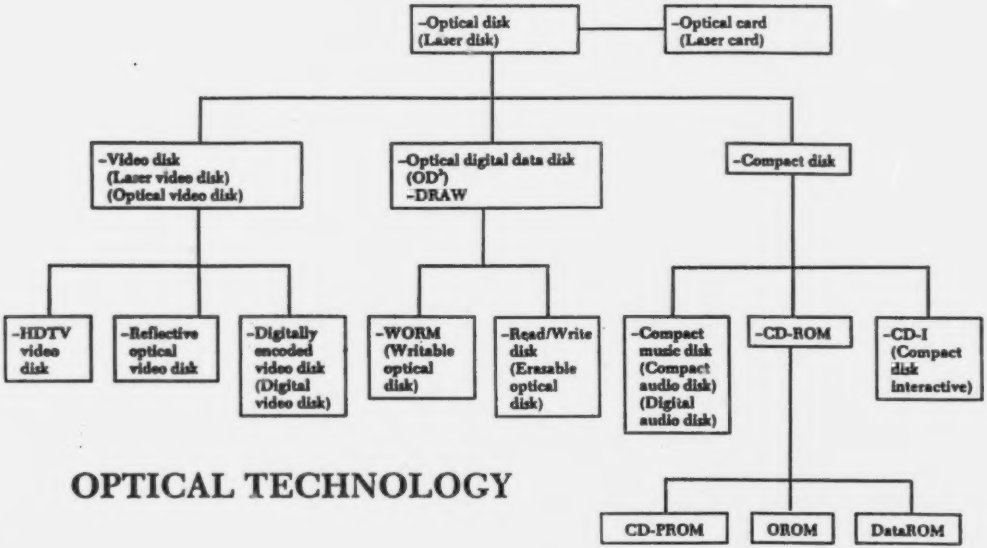
Online information database hosts are touched in the same way as libraries with their online catalogues. Online cataloguing databases and online catalogues for users are often kept in different systems because continuous online updating and heavy online access use are difficult to combine in one system. Although the online cataloguing databases do technically refer too to the taximeter syndrome they are not working like that because the catalogue librarians ignore the costs of the system when they use it. But it is different for the online information databases for users. Time and costs are running.

The costs for machinery and telecommunication are high and pressing. The user is not even going to pay the whole costs for the big information database hosts. In libraries it is almost impossible to distribute the costs of an online catalogue to users. So the library has to take care itself for these high costs. Therefore quite some libraries which have been pioneering in the introduction of OPAC had to limit the OPAC database and/or the OPAC use. The taximeter syndrome for OPAC is not bothering the user but the librarian who has to find the funding for the users bill when he takes time to search.

2. Can optical storage solve the taximeter syndrome for OPAC?

Table one shows the different techniques available within the optical disk technology (Table 1).

Table 1


-Optical disk (Laser disk)
-Optical card (Laser card)
-Video disk (Laser video disk) (Optical video disk)
-Optical digital data disk (OD^3) -DRAW
-Compact disk
-HDTV video disk
-Reflective optical video disk
-Digitally encoded video disk (Digital video disk)
-WORM (Writable optical disk)
-Read/Write disk (Erasable optical disk)
-Compact music disk (Compact audio disk) (Digital audio disk)
-CD-ROM
-CD-I (Compact disk interactive)
CD-PROM
OROM
DataROM

OPTICAL TECHNOLOGY

Source: Becker (2)

Still the principal characteristics of all optical storage media is in some kind statical storage. Erasable optical disk technology permitting optical media to overcome the problems of statical memory and to compete more directly magnetic media are still in the experimenting status. How far the erasability of optical disks will go we have to wait.

OPAC is principally only an online catalogue like any other online information database, normally not online updated. But naturally it is important that the online catalogue is not overaged. Therefore it needs periodical updating in not too long intervals. This is the main problem for optical disk technology. The problem is not anymore technically because the production time has become pretty short but it is mainly a problem of costs.

On the other hand the optical disk technology has big advantages to be used as online database and therefore for OPAC, too. The workstation for a CD-ROM unit, PC and CD-ROM drive, became almost as cheap as an intelligent mainframe terminal. In short time the CD-ROM drive will not cost much more than a normal CD player which is under $ 200 in the United States. I suppose that even in Germany the price next year will not be much more than DM 1.000,--. The minimal hardware needed for CD-ROM use is a cheap stand alone workstation and therefore does not need big machinery and telecommunication resources. The simplest version of a CD-ROM OPAC is the distribution of stand alone workstations within the library system. The CD-ROM supply is easy and cheap because the costs of disk duplication are low. Additional access points needed because of local reasons or increase of access rates require only to install further cheap workstations. Cheap, fast, easy online access to big masses of data with high retrieval comfort are the features which make CD-ROM technology interesting for OPACS, too.

Considering other optical disk technologies for example WORM it is not working the same way. If the equipment is available it is easy for a library to write the data on the CD-WORM itself. But on the other hand retrieval on this optical disk is as slow as in any other optical disk. This means that high access rates can only be reached by an adequate number of working stations and this needs duplication of disks which is difficult for WORM. Therefore WORM use for OPACS might not be probable.

3. State of the art of the CD-ROM technology

General use of CD-ROM for OPAC requires standards. Only "the physical level is already standard, but the applications level will probably never be standard - the applications level covers those features which use various different kinds of conventions, based on the types of products"(3). It is hoped that at least at the logical level a standard will be achieved e.g. for directories, volume and file sizes etc. which need to be identified and placed in a fixed location. Anyway the SCSI standard for hardware interfaces and High Sierra Standard for the logical and physical data organization have brought considerable progress but these standards are far away to be already generally implemented. Sometimes it is even very difficult to get driver software for different hardware combinations. And the whole CD-ROM development is still limited to MS-DOS operating system. It is impossible to get UNIX software for CD-ROM use at all. As for the big online hosts it is unrealistic to expect any standard for retrieval systems, even for a standard command language. So librarians as the users have to live with the variety.

The CD-ROM retrieval software originally has been much too slow. The first optical disk retrieval systems in the years 1984/85 recorded response time up to some 10 - 15 sec. In this part there has been considerable progress in the last two years. Average response time under ten, even under five sec. should belong to a standard today as well as flexible adaption of the user interface. The quality of software is very different. As far as I can see in the Federal Republic of Germany there are seven software systems only on the market: Microbases (from Batelle), BRS, Online, General Research (all four from the USA), DATAWARE 2000 (product originally developed in the USA and now sold by a German firm), BCB and CCS (the only in Germany developed products). In the USA there are a lot more. The big library networks as OCLC, WLN as well as CD-ROM producers like Silver Platter are starting to market their CD-ROM software.

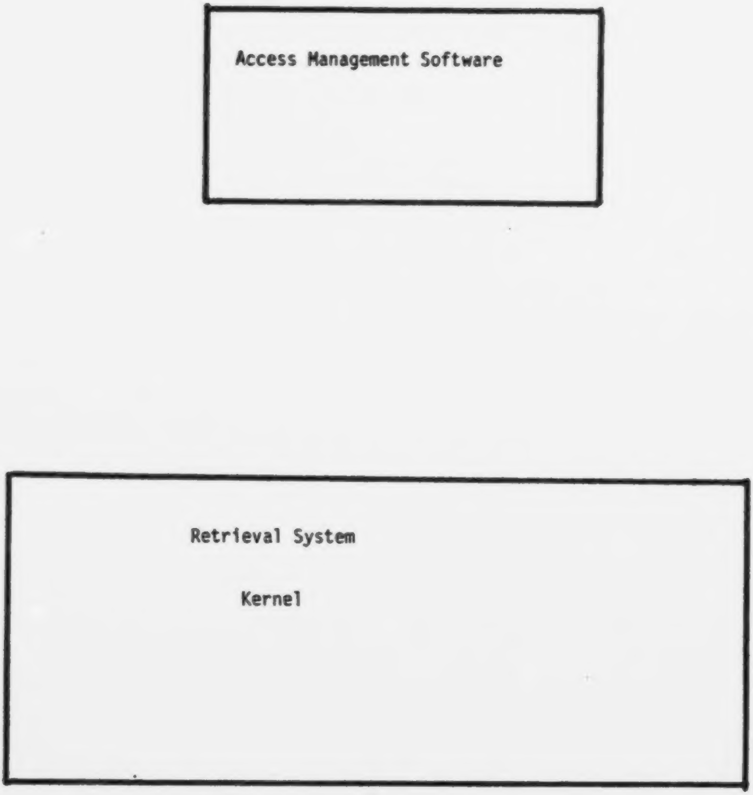
In the meantime some software products are coming with LAN (Local Area Network) software to extend networking capabilities to optical disk drives. These mainly refer to the 3COM network software. But the technical effort to run CD-ROM workstations within the network is considerable high and I am not sure if the LAN will finally be a serious competition to the stand alone working stations because the stand alone stations are technically simple, cheap and fitting to the easy duplication feature of the CD-ROM. So we have to wait if the LAN CD-ROM system for OPAC will become efficient. For OPAC use it is very much the same with the multiple users access to one CD-ROM drive.

But it is different with the access from one PC to more than one or multiple disk drives. The size of CD-ROM OPAC in bigger libraries is requiring more than one disk and therefore disk drive anyway.

Further parallel use of additional catalogues and databases on CD-ROM is to be expected in libraries. So there is without any doubt a need for multiple disk drives in libraries. Multiple disk drive access from one PC is principally no problem when the same software is used for all CD-ROM and the drives. But there are limitations which probably will not be overcome by technical reasons because of the variety of retrieval software used in the different databases. The different software refers to PC and drive. Each drive must be handled by the PC as separate unit, with new loading of software etc. Communication between the different CD-ROM, mixing or cumulating data from the different disks, repeating the same search etc. are not easy. It is not to be seen that there will be even in future any software available to solve this problem. This technical incompatibility has serious consequences for database use in libraries and in general. If several library databases should be used in the same library for example a local and a union catalogue having a supplementary function for the local catalogue they should use the same retrieval software. As already mentioned it is completely impossible to make all database producers use the same software. But library systems should carefully consider if and where the same CD-ROM software should be used to allow reasonable combination of CD-ROM catalogue use.

Almost in the last months only it looks like being a new trend for standardization in one point. More and more CD-ROM software packages are dividing the user interface and the kernel of the retrieval system. The kernel remains in principle always the same. Its flexibility consists in a changing amount of indexes depending on the different requirements of the data bases (Table 2).

Table 2


Access Management Software
Retrieval System
Kernel

On the other hand the user interface is completely flexible. The use of a software tool allows easy and fast change of the user interface referring to the purpose of any project. So any library can use its own user interface and the CD-ROM catalogue can get its own image without changing the retrieval software. Libraries in a local area or in a network should consider this possibility before splitting up the projects in a variety of different software with disadvantages for cooperation and use of different CD-ROM catalogues.

The splitting up of the CD-ROM software into kernel and user software is negatively influencing the speed. Maximising efficiency and speed of the software requires maximum streamlining from the top to the bottom. For this reason there are still some systems of this type on the market. But the progress in speeding up CD-ROM systems has been so fast in the last months that systems offering completely flexible user software are still fast enough and the speed difference to the streamlined systems became relatively small. Therefore the flexibility will probably get priority in all systems.

Updating of CD-ROM systems means two different types: Updating by the CD-ROM itself and updating between the CD-ROM editions. Updating of the CD-ROM itself is the reproduction of the CD-ROM with the latest status of the database. The interval of reproduction is limited by the costs. In the June issue of the Electronic and Optical Publishing Review (4) the costs for creating one disk in the United States have been calculated to be $ 15.000 to $ 20.000. Duplication costs have been shown to be $ 15 to $ 20 for a copy. So a library catalogue on one CD-ROM produced four times a year with 200 copies would cost at least $ 72.000. In commercial business this means selling costs of $ 1.080 per annual subscription only to recover the investment. But it should be mentioned that this costs will be heavily reduced in the next future. According to insider information the real costs for the data preparation of one disk are not anymore than $ 500 while the manufacturers still are collecting $ 5.000 to 7.000. The prices for the production of the CD-ROM are now already down to about $ 3.000. The tendency is still going down. So probably in not to long time the costs for the production of one CD-ROM including data preparation will come down to $ 2.000 plus duplication costs. But even when the production costs for CD-ROM are coming down to a very low level the efforts for the whole procedure will remain considerable. I can not imagine that a library could produce the CD-ROM catalogue weekly even when the money for the production costs is available. So using CD-ROM for OPAC means either updating in relatively long intervals or updating on hard disk in short intervals between the CD-ROM editions.

Therefore there must be established another updating procedure when the CD-ROM catalogue should become a serious competitioner to the mainframe OPAC. Some manufacturers have already announced but not yet made available software for searching recent acquisitions on hard disk. It will allow libraries to index and search new titles on hard disk and to update the catalogue at frequent intervals. Since this software is not yet available the extra charge for the segment is not yet clear. But because it is based on the general CD-ROM data preparation software the costs must be much lower than the price for the main software. The data preparation for the hard disk storage and retrieval can be done on mainframe or PC. Quite some manufacturers would prefer the mainframe because their programs for CD-ROM preparation are running on mainframe. On the other hand mainframe software is very unflexible because the data conversion must be done either on the manufacturer's mainframe or at least on a mainframe of the same type. Frequent, for example weekly, updating makes it difficult and expensive to transfer the data of a library to other mainframes in order to get them back for hard disk storage. So the future of hard disk updating for CD-ROM catalogues will probably belong to PC software for data preparation. Any library should be able to convert its own data of catalogue additions for hard disk retrieval between the CD-ROM editions.

As in other areas the CD-ROM hardware is developing fast. Hard disk is now almost belonging to the standard equipment of a PC with still heavily decreasing prices. Several manufacturers have now introduced PCs which allow to connect until sixteen CD-ROM drives with still increasing tendency. If the joke boxes which are announced or in the laboratory will finally be successful is not yet clear. Multi drive units are much faster and when the prices are coming to the bottom may be not even more expensive.

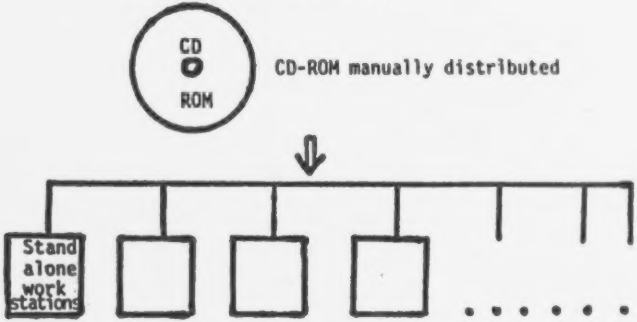
4. Updating the CD-ROM OPAC

At present CD-ROM is almost only used on one work station as stand alone system. Updating is done by reproduction of the CD-ROM. It is distributed to any stand alone work station of the OPAC. There is no updating between the CD-ROM editions. (Table 3)

Table 3

CD-ROM-OPAC

Updating (Present status)


CD
ROM
CD-ROM manually distributed
Stand alone work stations

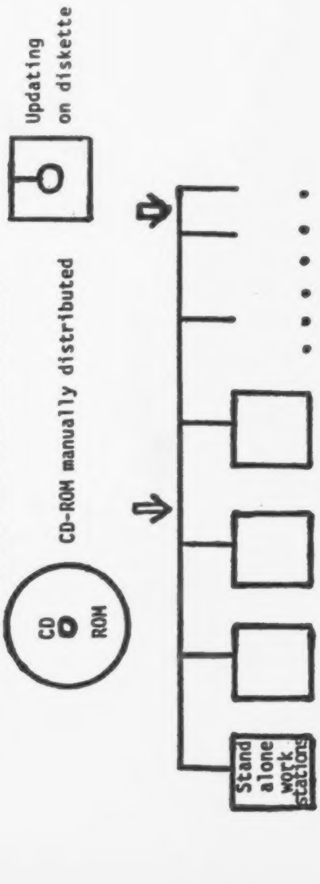
This will not be the final status of an OPAC on CD-ROM. The updating of the CD-ROM itself is the best solution but as shown above a monthly or even quarterly updating is not reasonable at the present costs.

The most simple hard disk updating procedure is done on diskette. The data for updating are transferred to diskettes and these are distributed to the different work stations as input media for the hard disk. (Table 4)

Table 4

CD-ROM-OPAC

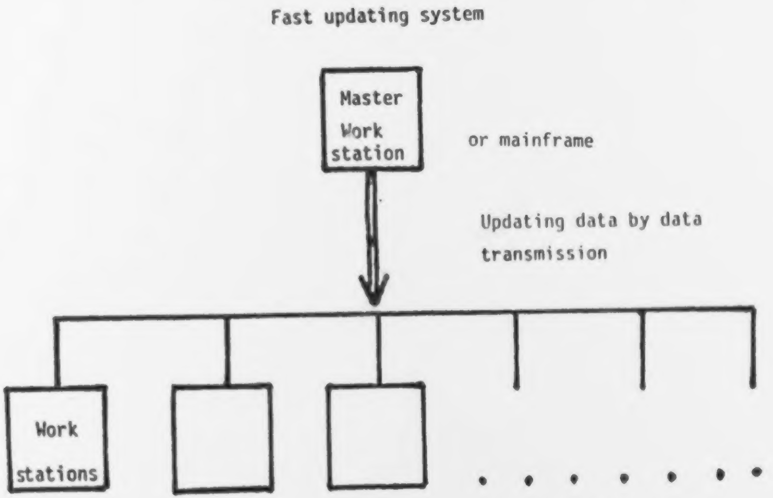
CD-ROM and hard disk via diskette


CD
ROM
CD-ROM manually distributed
Updating
on diskette
Stand
alone
work
stations

But this updating procedure is not always easy to handle. If it is functional, depends on the amount of data and work stations to be updated. When 10 or 20 diskettes are needed and the hard disks in 50 to 100 work stations have to be updated this way, the system will be given up very fast. So for bigger systems another updating procedure is needed. The work stations have to be connected by telecommunication lines with a mainframe or a master work station from where the updating data are transferred to the hard disks of all work stations (Table 5).

Table 5

Updating by data transfer from master PC or mainframe

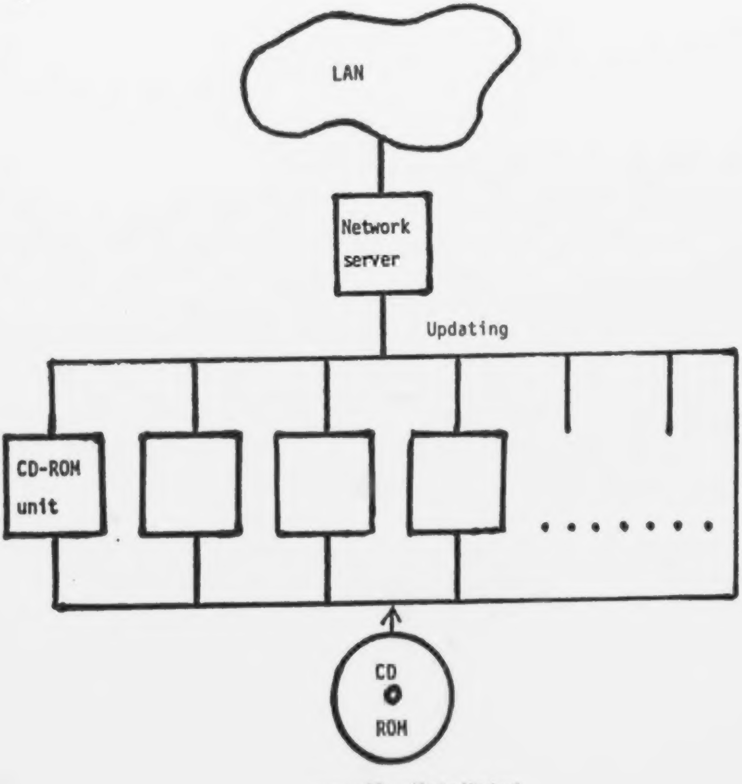

Fast updating system
Master Work station
or mainframe
Updating data by data transmission
Work stations

Even more comfort is available for updating when the CD-ROM OPAC is combined with a local area network (Table 6).

Table 6

LAN and CD-ROM-OPAC

Networking LAN


LAN
Network server
Updating
CD-ROM unit
CD
ROM

manually distributed

The communication soft- and hardware needed for the PC network and for the administration of the work station access is not very small considering the costs of stand alone units. Technically the CD-ROM network as part of the LAN is no problem - except that a fully functional software does not yet exist. Further it is no doubt that it would be the most comfortable system for users. But there is doubt if the CD-ROM OPAC with full network function is a reasonable solution in terms of cost/benefit relationship.

According to my personal view at present a CD-ROM OPAC should be principally based on stand alone units to keep the system simple and cheap. The updating by a CD-ROM will still be expensive enough to keep this updating in relatively long intervals depending on the resources available. In Germany I would suppose that for the near future of three years updating half a year or even only once a year will be probable. In any case the updating procedure on hard disk should be available. For cost/benefit reasons the hard disk updating should be done by one way file transfer from the mainframe or from a master PC to all work stations which is a simple procedure far away from the difficult requirements of the whole network service.

5. The CD-ROM future in libraries

The environment in libraries will include CD-ROM as standard equipment within one year. With the increasing number of CD-ROM databases available and their decreasing prices (in contrast to the prices of the online database use) the major libraries will have to keep a number of CD-ROM work stations depending on size and user distribution.

Another topic is the distribution of PCs. The PC will remain the most expensive part of a CD-ROM work station. PCs are already very common and will be available everywhere like typing machines in short time. For CD-ROM use only the - in some months - very cheap CD-ROM drive has to be added. So in the environment of a university or an industrial firm the principle of a CD-ROM catalogue does very well meet the equipment capacity available for different other reasons. Most people can be supplied with a CD-ROM catalogue (may be without the hard disk updating) almost without additional investment.

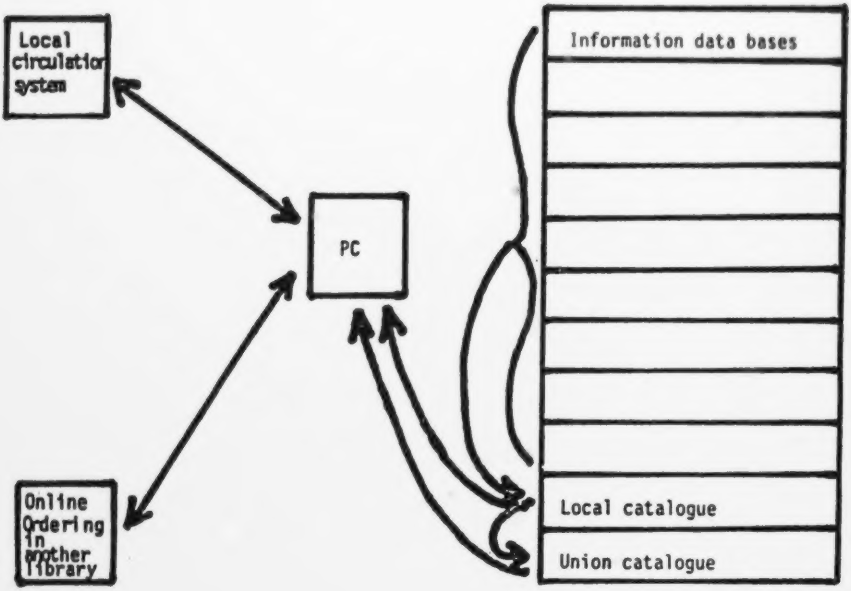
The library catalogue on CD-ROM will then be used by everybody who is going to use CD-ROM at all. This can naturally be done everywhere within or without the library. If the amount of data to be updated between CD-ROM editions is not too big these can even be distributed to the public on diskettes as it is done in other areas.

This leads to another aspect of CD-ROM use within and without the library: the combined use of all kind of CD-ROM databases including the catalogue. Via multi drive CD-ROM units several databases can be accessed by the same PC. They can be searched by a search chain starting for example in an information database like PSYCHLIT or ERIC then continuing with the local library catalogue and if necessary with the union catalogue on CD-ROM to find the location of the literature needed. In libraries (Table 7) the search can finally be combined with the circulation system and/or the interlibrary loan system for ordering the books. The search in different CD-ROM databases via multi drive units does work too when different retrieval systems are used. In this case the procedures are a bit more uncomfortable but still better than anything else which does not exist.

May be libraries will offer in future almost the whole service of a library as literature information service, literature location information, local or interlibrary teleordering etc. - except the book supply itself - by a relatively small and cheap PC work station. When electronic publishing and document delivery is provided even the text can be supplied on CD-ROM and PC.

Table 7

Complete User work station with CD-ROM-Multidrive


Local circulation system
PC
Information data bases
Online Ordering in another library
Local catalogue
Union catalogue

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MULTISTATE LIBRARY NETWORKS: A MODEL FOR LAY REPRESENTATION ON LIBRARY NETWORK BOARDS

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MULTISTATE LIBRARY NETWORKS: A MODEL FOR LAY REPRESENTATION ON LIBRARY NETWORK BOARDS

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Abstract

The paper reviews the literature on network governance as it relates to network boards, discusses the composition of multistate network boards, and recommends a model for lay representation on network governing boards and advisory councils.

Introductory Footnote

Louella Wetherbee is Executive Director of the AMIGOS Bibliographic Council, Inc., a multistate network serving the southwestern United States. Ms. Wetherbee holds B.A. and M.L.S. degrees from the University of Texas at Austin. Her mailing address is 11300 North Central Expressway, Suite 321, Dallas, Texas, 75243. The author wishes to acknowledge the assistance she received from the following individuals in preparing the section of the paper on network board composition: H.E. Broadbent, David Brunell, William DeJohn, Frank Grisham, Mary Ellen Jacob, Ron Miller, Laima Mockus, James Riley, Dennis Reynolds, Jim Schoening and N.A. Stussy.

MULTISTATE LIBRARY NETWORKS: A MODEL FOR LAY REPRESENTATION ON LIBRARY NETWORK BOARDS

The purpose of this paper is to review the organization of governing boards of selected multistate library networks and to propose a model for lay representation on these boards.

The paper briefly reviews the literature on network governance as it relates to governing bodies. As very little has been written that specifically refers to the ideal organizational structure for network boards, current models used by regional networks for selecting and organizing boards are reviewed. Particular attention is paid to the role of lay trustees. Other models for securing outside legal, financial and planning expertise also are explored.

The term "trustee" when used in this paper means an elected or appointed member of a network governing board or council. The term "lay trustee" means a person from outside the library and information science community serving on a board.

Some comments also will be made concerning the role of outside expertise in network management as the two functions, management and governance, are interrelated and tend to overlap in some instances. Outside expertise is widely used by networks in both management and governance.

The final section of the paper proposes a model for effective lay representation on network governing boards. Some recommendations are made about recruiting and integrating lay trustees onto network boards.

Library Network Governance

Since the mid-1970s, a number of papers have been written that are either partially or fully devoted to network governance. In 1978, a conference on the structure and governance of library networks was held in Pittsburgh (1). The issue of network governance is a topic of ongoing concern to the Library of Congress Network Advisory Committee, which sponsored a program in 1980 on governance issues for a nation-wide library network (2). As library participation in networks has increased during the past decade, the importance of developing workable, effective network governance models has increased.

Although libraries cooperate for a variety of reasons, this paper is limited to a discussion of large, multistate networks using automation for the delivery of services. It is likely, however, that many of the factors pertinent to effective governance of these organizations are applicable to other types of resource sharing networks at the state or local level.

In a key 1977 paper on network governance, Stevens noted that network governance had not stabilized around a model. He further noted that no theoretical model existed upon which networks could be built (3). A decade later, Stevens' assertions regarding the lack of a single viable model for effective network governance are still valid.

In recent years networks have proliferated at the state and local level. This growth has been spurred by the development of shared automated library systems for cataloguing, circulation and other functions. The role of library networks since 1977 has broadened and deepened as a result of the maturation of automated library systems. In addition, a variety of economic and political factors continue to make resource sharing attractive. Several different organizational models for library networks are emerging; it is unlikely that a single model can or should be developed for network governance.

Participation in any library network involves trade-offs for the participants. Kent described this phenomenon in terms of loss of autonomy. He states that "the basic objective of networks frequently entails a shift from reliance on 'local holdings' to reliance on 'access' to materials held elsewhere" (4). Obviously, as network members sense a loss of local control, they will move to regain some portion of that control through participation in the governance of the network.

Carlile emphasizes the importance of laying a proper foundation for networks based on three factors: legal structure, membership or constituency and governance. He defines governance as "the structure and administration of the power relationships among various organizational stakeholders within the shared activity or network".

Carlile clearly distinguishes between governance and management and provides a succinct and thoughtful list of twenty-two characteristics that ought to be present in a successful governance model (5). Several of those characteristics are pertinent to the formation of network governing boards. They include:

- Balanced representation of a diverse constituency in the governance, either directly or indirectly
- Communication from the constituency to governance, and accountability from governance to constituency
- Ability to balance centrality of control and direction with the diverse needs of the constituency
- Assurance of financial stability
- Provision of an interface with the private sector, and federal and state governments
- Ability to generate correct and intelligent decisions quickly and under pressure
- Ability to avoid political obstacles to performance
- Ability to act on behalf of, protect and shield the membership
- Ability to provide a united face on behalf of the network to third parties

Although Carlile does not specifically discuss appropriate network board composition, his list of attributes should be kept in mind in the formation and operation of a successful network board.

A key component in network success is the selection, organization and operation of an effective governing board or council. Narrowness in board composition may hamper network development. Along with fair representation of all types and sizes of member libraries, the use of lay representatives on network boards can help insure broad based, non-parochial decision making.

Most networks form a governing board or advisory council which controls policy for the network and makes the relevant decisions concerning scope of service and selection of staff. In some instances, the role of the network board is ambiguous. It may serve primarily an advisory function, but hold some decision making power. This is often the case where the network functions under the aegis of a parent body.

Roles and Responsibilities of Network Boards

Duca lists the following general categories of board responsibilities in nonprofit organizations:

- Clarify the organization's mission
- Interpret the mission statement to the public and enhance the organization's public image
- Approve goals and objectives/set long-range plans
- Establish policies and other guide-lines
- Assume legal responsibility for all aspects of the organization's operations
- Ensure financial stability and solvency
- Hire and support the executive director and assess his performance
- Evaluate the performance of the organization and the board itself (6).

Network boards, especially governing boards of independent member controlled networks, have many or all these responsibilities. Indeed, the trend among multistate networks such as NELINET, SOLINET and AMIGOS has been toward increased member control through directly elected boards.

Numerous considerations come to mind when developing the optimum board structure: size, composition, organization and lay representation are among the most common. But just as there can be no single model for overall network governance, there exists no universal model for a network board. If a generalization can be made, it is that the sometimes ambiguous and often conflicting goals of all networks make it imperative for each to assemble a board composed of knowledgeable, objective and involved trustees. A board member who is unable to spend the time necessary to master the key political, economic and technological issues in the field - or attend board functions - is unlikely to make a meaningful contribution.

Duca divides boards into large (30+ members), medium (20-30 members), and small (fewer than 20 members) (7). All but two of the 12 multistate networks contacted for this paper have boards of 15 or fewer members.

Although most network boards would be classified as small, seven of the 12 boards surveyed for this study currently include elected or appointed voting lay representatives. At least one other network has had lay representatives in the past and is considering a change of bylaws that would mandate lay representation. Of the networks with lay representatives, one is considering dropping lay representation. Where lay representation is not mandated by network governing documents, there are a variety of methods used to secure outside expertise when needed. These alternatives will be discussed later.

The literature on network board composition and organization is quite limited. Network boards, however, can be presumed to share some common factors with library boards since both organizations are in existence for the same ultimate purpose: to provide information services to library patrons. Virginia Young in her book on library trustees notes that

> every segment of today's society has a stake in the community library, and the needs and desires of every segment of society should be represented in the library's program (8).

She later writes that library trustees may be called upon to serve on network boards and adds that

> this demands mastering legal responsibilities of broader scope, handling more money, and somehow raising [the trustee's] library sights above the familiar provincialism of his local library horizons (9).

In 1971, Hacker cited as a problem in network planning the "possibility that network planners may overlook their responsibilities to the public". His solution:

> Encourage active participation in the evaluation of networks by students, faculty, research personnel, and the general public through advisory committees, **lay network boards of trustees**, and evaluation of network performance at regular intervals (10) (emphasis added).

Pointing up the need for broad representation in network governance structures, Mathews wrote in 1978 that

> ...a library network must draw on very diverse talents for input into its governance process. It must not ... be dominated by a luff of librarians, a mumble of

> moneymongers, a puff of politicians, a nettle of network directors, or a usurpation of users ... There should also be a mix of types and philosophical leanings among the governors - thinkers and doers, speculators and practitioners ... (11).

In a 1974 report on the feasibility of a cooperative bibliographic centre for Indiana, Markuson comments:

> The INCOLSA Executive Director and Executive Committee should avail themselves of outside expertise in management. For example, there is free expertise available on a short-time basis from experienced retired and active business executives through SCORE (Service Corps of Retired Executives) and ACE (Active Corps of Executives) for which INCOLSA may be eligible (12).

Given that network boards tend to be small, it is important to consider the role of each member of the board. Network boards are elected by network members and have a responsibility to represent the interests of their constituents. If lay trustees are to be used, their selection and integration into network affairs needs to be carefully planned.

Among networks that have chosen to use lay trustees, a variety of models for their selection and participation have evolved. Both these models and other methods for securing outside financial, legal and planning expertise are reviewed below. As noted above, some networks have a second governance body above the member-elected board. For example, the CAPCON Board of Advisors reports to a parent board. Only the board or council closest to the network membership is fully explored here.

Network Board Composition

(The majority of the information contained in this section was collected through interviews which the author conducted with the directors or other representatives of the networks included in this paper. Other sources are appropriately noted.)

AMIGOS (AMIGOS Bibliographic Council, Inc.)

AMIGOS is a nonprofit regional network serving the southwestern U.S. and Mexico. The AMIGOS Board is composed of 12 trustees directly elected by the network members. The trustees serve three-year, overlapping terms. Nine trustees are selected from among registered representatives of member institutions and three must be persons who are or have been active in civic, private or institutional management. Persons who may be considered include academic officials, state or local governmental officials, private corporation executives and community leaders. One of the three lay trustees should have had demonstrated experience and competence in fiscal affairs (13). AMIGOS has had lay trustees from all of the above categories, including a data processing manager for a large city, a university dean, a university vice-president for fiscal affairs, a microcomputer company president, a financial management consultant, and an attorney. The lay trustees are nominated in the same manner as library member trustees. Although they normally have not been elected to a principal office, they are frequently on committees.

BCR (Bibliographic Centre for Research)

BCR, a nonprofit organization serving libraries in the Rocky Mountain states, has existed since the 1930s. It currently is governed by a 13-member Board of Trustees with mixed membership; seats are mandated in the bylaws for the chief officer of each state library member (five at present). In addition there are five representative trustees and three at-large trustees. The representative trustees are elected according to type of library (14). A recent reorganization of the board resulted in extending the vote to all trustees. Formerly, only the state library trustees were able to vote, while the other seats were advisory and non-voting. BCR has not used lay trustees, although outside legal and financial expertise is used, both pro-bono and paid.

CAPCON (Capital Consortium Network)

CAPCON is a program of the Consortium of Universities of the Metropolitan Washington Area, a nonprofit corporation. CAPCON serves libraries in the District of Columbia, Maryland and Virginia. The CAPCON Board of Advisors acts as an advisory body to the Consortium, but has had specific responsibilities delegated to it, including setting fees and determining criteria for network membership and participation. The Consortium retains final authority over selection of an Executive Director. The Board of Advisors is composed of nine elected members, seven of whom are the chief administrative officers of member libraries and two of whom are "nonlibrarians or non-practicing librarians active in business, civic, or political areas" (15). A new structure is currently under consideration which would result in the elimination of the requirement for non-library trustees. This same proposal also would mandate representation on the Board by type and size of library (16). Lay trustees in the past have included retired librarians and an attorney. The network seeks outside expertise in the legal and financial areas. In the latter area, lay trustees of the parent board are able to provide advice, while legal assistance is hired as needed.

CLASS (Cooperative Library Agency for Systems and Services)

Organized under a "Joint Exercise of Powers Agreement" among various California jurisdictions, CLASS serves libraries nation-wide, although the majority of members are in the west. Six voting seats on the Board of Directors are allocated to the original parties to the agreement. The Board was enlarged in 1981 to include 9 non-voting members who are elected on a proportional basis from among the various segments of the membership: academic libraries, community college/school libraries, state libraries, public libraries, and special/other libraries. As a consequence of the governance model chosen, CLASS has a number of lay trustees. The six voting members are the chief officers or their designees from the original parties to the agreement, including the California State Librarian, the President of the University of California, the Chancellors of the state university and community college systems, the Mayor of Los Angeles, and a member of the Santa Clara County Board of Supervisors (17). In addition, non-voting members may be non-librarians. In the past, a lay representative has been elected to represent the special library membership segment.

FEDLINK (Federal Library and Information Network)

FEDLINK derives its authority from the Federal Library and Information Committee (FLICC). It has an Executive Advisory Council consisting of nine members serving staggered terms. Although not a governing body in the strict sense of the word, the EAC exercises considerable power. The EAC has responsibility for setting policy, establishing and charging committees, recommending budgets to the membership, overseeing the annual budget, authorizing contracts, and settling disputes concerning membership or voting (18).

There are no mandated seats on the board, but informal consideration is given to securing representation from the three branches of government. No lay persons are on the EAC. Outside assistance, when needed, is either contracted for or provided by the Library of Congress.

MINITEX (Minnesota Interlibrary Telecommunications Exchange)

MINITEX functions under the aegis of the Higher Education Coordinating Board of the state of Minnesota (HECB). The network is a program of the HECB. It serves libraries in Minnesota, North Dakota and South Dakota. A MINITEX Advisory Committee exists to "advise [the HECB] regarding policies, programs, goals and planning" (19). The Advisory Committee, appointed by the HECB, is composed of 13 members who are elected from various library constituencies. There is no elected lay council member, but the HECB program officer responsible for MINITEX, a non-librarian, serves in an ex-officio capacity on the council. In addition, HECB is also advised by a MINITEX/OCLC Users Group composed of OCLC participating libraries. Both bodies serve an advisory role only and do not include elected lay members. Assistance in financial and/or legal areas comes through the HECB staff. Long range planning has been accomplished by network members.

NELINET, Inc.

NELINET is organized as a nonprofit network. Although not limited by its bylaws in geographic scope, NELINET operates chiefly in the New England states, with headquarters in Massachusetts. The Board of Directors can be composed of from three to 15 members, elected by the members, and who serve three-year overlapping terms. Normally 12 members are elected. The NELINET Executive Director is a voting Board member (20).

There are no mandated seats based on geography, type or size of library, nor is there provision for lay membership on the Board of Directors. Consideration has been given in the past to such representation, but when outside expertise is required, it usually is hired. NELINET has included a non-voting member on the Board Finance Committee on two occasions. These individuals served without compensation. One was a comptroller in an academic institution and the other was a business school professor. Other external assistance has included hiring legal expertise and retaining a consulting firm for development of a long range plan.

OCLC (OCLC Online Computer Library Centre, Inc.)

OCLC is organized as a nonprofit corporation in the state of Ohio. It has grown from a state network to an international organization, and its governance structure has undergone changes appropriate to a growing organization. This rather complex structure is described in detail in the literature (21). The OCLC Board of Trustees is comprised of 15 voting members selected in several different ways to insure broad representation of interests. Frederick Kilgour, the founder of OCLC, serves as the sixteenth non-voting board member. Of the voting members, five must be from

> categories such as ... an executive officer of a large corporation; an individual experienced in banking and finance; an individual with background or present service in government, national, state or local; an economist; an accountant with experience in taxation and business enterprise; an attorney with experience in corporation law; an individual with experience in electronic computer science or industry; an individual with experience in communications technology; an individual with marketing and distribution knowledge ... (22).

Three trustees must be members of the library profession and six are elected by the OCLC Users Council from among its own membership.

PALINET and Union Library Catalogue of Pennsylvania

PALINET is a nonprofit corporation providing library services principally to libraries in the middle Atlantic states, although the network may operate wherever the Board of Trustees directs. The Board is composed of 15 voting members serving staggered terms. Thirteen trustees are elected by the members and "two shall be appointed by the Board from the public-at-large" (23). The appointed lay trustees have usually been drawn from the legal or banking professions. The Board often selects from among candidates identified by the network director. The lay trustees do not usually serve on committees, but the Finance Committee does include a banker. Additional outside expertise in the areas of finance, legal matters or strategic planning has been hired as needed.

PRLC (Pittsburgh Regional Library Centre)

PRLC is organized as a nonprofit corporation in the state of Pennsylvania devoted to the promotion of various services to libraries in Pittsburgh and surrounding areas. Each library member annually designates two persons to serve as trustees of the Centre. One of the two trustees appointed by each member is the head librarian or another senior library staff member (24).

When PRLC was formed, there were only nine network members, and this structure was quite workable. Given the growth of the network, a committee has been formed to consider reorganization of the governance structure. According to the network director, the original intent was to have each institution appoint a librarian and a non-librarian trustee; currently approximately 10 percent of the trustees are lay people. Lay trustees have included library trustees, academicians, and computer centre personnel. Most lay trustees have not been particularly active members, although some have.

Additional outside expertise also is used. PRLC has retained a financial planner for investment decisions. Legal advice is provided at a preferential rate through the firm of an attorney serving on the board. No outside assistance for planning has been used recently.

SOLINET (Southeastern Library Network, Inc.)

SOLINET operates as a tax exempt organization whose primary service area includes the southeastern United States. By board action, SOLINET may operate in the Caribbean basin and in portions of Central and South America. The Board of Directors has 11 members who serve three-year overlapping terms. Five of the seats are allocated to representatives of the Association of Southeastern Research Libraries (ASERL). Four are elected from among representatives of other academic libraries and the remaining two are from non-academic member libraries. Although no seats are required to be filled by lay trustees, the bylaws provide that "directors shall be affiliated with a member institution as an administrator, professional employee, or representative of the governing board of the institution" (25).

SOLINET is currently considering enlarging the board to 13 members. One of the 13 members would be elected by the other directors. This person would be a senior administrator from a college, a university or local government.

SOLINET has utilized outside expertise in several ways. University and community college administrators have served on previous boards. The Board Financial Advisory Committee has a lay financial advisor. Although not a board member, this individual is invited to board meetings. SOLINET has worked with the Executive Service Corps of United Way, and the network has been assigned, at its request, a team of retired executives who advise management on personnel and financial matters as well as strategic planning. At other times, the SOLINET Board has sought technical expertise through a Technical Advisory Committee composed of computer experts. SOLINET retains a local firm for legal advice, but in the past has had a staff attorney.

WLN (Western Library Network)

WLN operates under the auspices of the Washington State Library Commission and serves libraries principally in the Pacific northwest. A Network Services Council recommends policy on network services to the Commission. The Council has a major role in reviewing long range plans, budgets and network fees, but does not control these directly.

The Council is made up of not more than eleven members. Four members of the Council are selected from Washington state, of whom three must be principal members who own or lease terminals. Representatives from other states are elected as each state determines. One member serves from each of the other states where at least three libraries participate in the network computer service (26). Although the Council bylaws would not seem to prohibit the election of a lay person, normally the council members are librarians.

WLN does not seem to make extensive use of outside expertise in the areas of finance, legal issues or long range planning. The state treasurer's office and the state attorney general provide help in the first categories and planning is done in-house with input from the Network Services Council. Although the Council does not include lay persons, the parent state commission is composed largely of non-librarians, including an attorney, a financial consultant, a retired economics professor, and the state superintendent of public instruction.

Outside Expertise: The Options

This review of network practices indicates that networks commonly use outside expertise in decision making. The major areas where assistance has been sought include financial management, investments, budget preparation, legal issues, technical planning, long range or strategic planning, network organization and personnel matters.

A wide range of methods for securing competent outside expertise is observed, with many networks using more than one method, including:

- Elected lay trustees
- Appointed lay trustees
- Advisors to board committees
- Advisory committees to the board composed of outside experts
- Pro-bono legal and financial advice from persons unaffiliated with the network members
- Pro-bono advice from employees of member organizations
- Pro-bono advice from trustees or staff of parent organizations
- Reduced rate legal advice
- Volunteer experts (usually retired executives) as advisors to management and/or board

Five of the larger networks with self-governing boards including OCLC, SOLINET, AMIGOS, PALINET and CLASS have a tradition of lay membership on their respective boards; networks with advisory bodies seem less likely to have lay representatives on the advisory group, relying on parent organizations for needed expertise in specialized areas. The networks that have traditionally used elected or appointed lay trustees have similar requirements for the types of individuals who should be selected. A review of these characteristics will shed light on the kinds of expertise that networks must have available to function effectively.

Networks should consider the implications of these skills for future network staff development. OCLC, and to some extent, SOLINET and AMIGOS have moved toward integration of employees with training in specialized areas. OCLC has in-house legal, financial and strategic planning officers. AMIGOS and SOLINET each have in-house financial officers and SOLINET has had a staff attorney.

Elected or appointed lay network trustees seem to have similar characteristics. AMIGOS has divided the desired skills and experience of lay trustees into three categories. These categories are suggested along with a fourth category to accommodate non-management expertise. The categories are listed here with examples of generic titles of actual trustees who have served on different network boards:

Category A: Civic Management

- National, state, or local elected government officials such as mayors, or county supervisors
- state or local government employees

Category B: Private Management

- Attorneys
- Bankers
- Corporation or company presidents/chief executive officers
- Corporate legal counsel
- Corporate financial officers
- Corporate data processing managers
- Corporate marketing specialists

- Corporate computer/communications officers
- Financial managers
- Financial management consultants

Category C: Institutional Management

- University/college presidents/deans
- University system administrators
- Academic fiscal affairs officers
- Community college administrators

Category D: Non-Managerial Expertise

- Library trustees
- Professors

The presence of government employees or elected officials on network boards provides some insurance that the network will take into account the needs of the larger community in planning. A link to decision makers in community and state government is essential for sound network planning. Although this can be accomplished informally by the network manager, trustees from this category can strengthen the tie.

Representatives of private management frequently are asked to serve on network boards. Their contribution appears to centre primarily on providing financial and legal advice. They also advise on network planning needs, computer and telecommunications technology issues and act as informal "management consultants" to network trustees and staff.

At least three networks in this study mentioned the use of retired company executives as either board members or other types of network advisors. This avenue of readily available, low cost expertise could be tapped by networks who need outside management advice but have no provision for lay trustees.

The frequent mention of financial and legal expertise as desirable background for lay trustees indicates that networks may have increasingly complex needs in these areas. As budgets grow and service areas expand, networks find that a bookkeeper is no longer enough to manage network financial affairs. Networks will continue to move toward hiring in-house expertise in these areas; these resources can then be supplemented with advice from lay trustees.

Networks have a history that links them closely to the academic library community. A number of networks began as programs that grew out of higher education consortia; several others mentioned above, notably MINITEX and CAPCON, have retained their identity as programs within an academic body. SOLINET clearly demonstrates this close link by providing for dedicated seats on its board for ASERL libraries. It is easy to understand the common presence on network boards of academicians. However, as networks expand beyond the university/college environment, as have all the networks in this paper, new implications for appropriate representation on boards begin to arise. SOLINET, for example, is reviewing a proposed board enlargement to provide a guaranteed seat for a public library representative. It may soon become more common to see city and or county administrators join their counterparts from the academic community on network boards.

This change will surely occur over a period of time, but the history of networking will continue to guarantee a strong voice to the academic community in terms of both practitioners and lay trustees. The costs of participation in many networks which have technologically powerful and expensive programs as their main thrust will slow the integration of other library constituencies into networking. This is the case with both public and school libraries.

Library trustees have served on network boards, but they did not emerge as a major group. Additional links between library boards and network boards undoubtedly would be beneficial for networking. The library end-user might thus have a larger voice in key network decisions.

A Model for Lay Representation

Networks very clearly need and want outside expertise in several areas. They have evolved a variety of innovative ways of securing that assistance. While no one model is always appropriate, the use of lay trustees has some important advantages and constitutes an efficient and effective model.

Consistency

If written into the bylaws of the network, lay trusteeship can become a normal part of network governance. Over a period of time, this will build a corps of informed and committed lay trustee alumni who can return to their posts with a greater understanding of the importance of networks in the provision of quality library and information service to their communities. This benefit is long term and is of great potential importance as libraries and the networks that serve them compete for scarce public resources.

Commitment

Members of the public-at-large, when elected or appointed to a network board, will have a deeper commitment to the network than if asked simply to provide advice on an ad hoc basis. As a network board member, the trustee can become part of the network environment. Although networks have effectively used lay persons as advisors, board membership provides a broader opportunity to utilize the full range of talents of the volunteer.

While network trustees can serve effectively in appointed positions, trustees who stand for election must think about the responsibility of board membership. In the case of AMIGOS, lay nominees to the board are asked to prepare a brief position statement that is distributed to voting members. In addition, lay trustee nominees attend the network election and are expected to speak to the members about their viewpoints. Such advance preparation encourages an early commitment to the organization by the potential trustees.

Objectivity

There are some inherent potential conflict of interest issues for network member trustees. Lay trustees can act as objective voices on the board. For example, trustees are frequently faced with decisions that cause them to put network interests (the welfare of all members) above local interests (welfare of a single library). This could occur when a proposed fee change might benefit the majority of members but raise costs for a small group of libraries. Lay trustees are less likely to be affected by such conflicts.

End-User Representation

Lay trustees can provide a voice in network decision making for the end-user. Networks are far removed from the actual service delivery that they support through libraries. It is useful to keep the needs of the end-user in mind as network programs are planned. Lay trustees from the public-at-large can fill this role.

Critical Skills

An obvious reason for the addition of lay trustees to network boards is their expertise. This reason for including the lay person with special skills will diminish as networks increasingly seek outside advice in the legal, financial and planning areas on a fee basis and integrate staff members with special training. Still, the value of board members with broad business, civic or institutional experience should not be underestimated. Networks are arcane organizations, whose role and function is difficult to explain to the general public. There are long term benefits for networks that cultivate board members from among the informed decision makers and policy makers in their communities, particularly where such individuals can offer concrete advice to the network in setting goals, designing and funding programs.

Once a decision has been made to integrate lay trustees into network governing bodies, the existing board and network management must take an active role to insure the successful participation of these individuals. The key factors are these:

Identifying Appropriate Candidates

Network boards, staff and members all can provide assistance. A broad pool of potential trustees should be sought. Network staff should continually be alert to identify possible lay trustees.

Interviewing Potential Board Members

The network manager and the board president should conduct a preliminary interview with potential board members. The requirements of board membership should be spelled out in detail including time commitment, preparation, travel, etc. The interview should include an overview of network goals and plans, the financial basis for the network, and a description of the protection offered to trustees in terms of indemnification and directors' and officers' insurance.

Providing Network Orientation

Once a lay trustee has been elected or appointed to the board, a full orientation to network activities should take place prior to the first board meeting. One network director noted that lay trustees receive the same three hour orientation as network member trustees. He felt it was adequate, but found that library and network jargon was an impediment. Another director commented that all trustees need an orientation to network issues while lay trustees might also need orientation to library issues.

Orientation methods vary from network to network. For example, SOLINET, AMIGOS and PALINET hold formal orientation sessions that include all trustees. SOLINET holds a day long meeting at which old and new board members meet together; formal presentations are made by the board chairperson and network staff. New trustees receive a board manual. Informal orientation is supplied to lay members by several networks.

Recognizing service

When trustees complete their terms, their home organizations should receive a letter of appreciation for their service. This applies equally to lay trustees and to library trustees. Such a step helps recognize the contribution made by the trustee and raises the image of the network.

In summary, networks need access to a wide range of expertise to function effectively. No single network manager or board member can supply this expertise. Networks should utilize multiple methods for securing advice. An excellent method that should receive particular attention is the inclusion of lay trustees on network boards.

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EUROPEAN AND NORTH AMERICAN LIBRARY CO-OPERATION OPPORTUNITIES FOR RESOURCE SHARING

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EUROPEAN AND NORTH AMERICAN LIBRARY CO-OPERATION OPPORTUNITIES FOR RESOURCE SHARING

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Abstract

The paper will consider the practical ways in which OCLC is acting as a catalyst in establishing an infrastructure which is enabling library communities in North America, Europe and the Asia Pacific region to share resources with one another. Some of the products and services which serve as the instruments of that resource sharing will be described (and demonstrated during the exhibition).

The speaker will review the philosophy for co-operation which OCLC pursues, particularly in Europe, and will cite a number of actual programmes of co-operation already operational in Europe.

The paper will conclude with a summary of the major research and development programmes which OCLC is embarked on describing OCLC current work in electronic document supply, electronic publishing. Also the OCLC reference and cataloguing services which utilize optical-disk technology will be described and demonstrated.

EUROPEAN AND NORTH AMERICAN LIBRARY CO-OPERATION OPPORTUNITIES FOR RESOURCE SHARING

1. OCLC's International Strategy

May I thank Ahmed Helal for inviting me again, as one of his Little Foxes, to participate in the 10th Essener Symposium, in honour of Professor Pflug. I had the good fortune of entertaining a delegation of six librarians from Germany early in the life of the Birmingham Libraries Co-operative BLCMP in 1971 and discussing the exciting achievements of Bochum at that time!

Mr. Chairman, as you will have read in the synopsis of papers, when considering opportunities for resource sharing I propose to address three issues.

i OCLC's strategy for resource sharing in Europe, and the achievements of that strategy so far

ii the means of resource sharing - the products and services, and the primary resource, the database

iii the current status of some of the new products under development, and the opportunity to share in the application of these new products

My paper will address the first and last issues. The richness of the database and the power of the systems in its support may be witnessed in the exhibition area where we have the facility to demonstrate a variety of products and services.

I was delighted to have the opportunity to listen to Adriane Iljon of the Commission of the European Community, when she outlined to us yesterday morning, the role which the Commission might realistically play in fostering European Library Co-operation.

It was refreshing to recognise a pragmatic approach being proposed which establishes the framework for library co-operation in Europe. The five action lines to be pursued by the Commission, in association with the nations of Europe, during the next five years are I think significant for the realisation of practical co-operation.

Let me just remind you of the action lines described to us in order of budgetary importance:

1) Bibliographic Database building
2) Network development
3) Innovative Service development
4) Dissemination of knowledge
5) Development of library specific, commercially viable, products and services

I remind you of these action lines as a backdrop to OCLC's European Strategy:

OCLC's international strategy is honed by the environment within which it exists. It is directed by past experience and new expectations. It is measured by research and development and appraised by benefit. It is always tempered by its "not for profit" status and its charter, which reads:

> "The purpose or purposes for which this Corporation is formed are to establish, maintain and operate a computerised library network and to promote the evolution of library use, of libraries themselves, and of librarianship, and to provide processes and products for the benefit of library users and libraries, including such objectives as increasing availability of library resources to individual library patrons and reducing rate-of-rise of library per-unit costs, all for the fundamental public purpose of furthering ease of access to and use of the ever-expanding body of worldwide scientific, literary and educational knowledge and information."

OCLC's international strategy has been developed during the last seven years and implemented in a series of actions marked by the milestones of the first international branch office being opened in Birmingham, England, in 1981 followed in 1986 and 1987 by offices being delegated responsibility for the Asia/Pacific region and Canada. These initiatives can be corporately described as a family of international initiatives based on a singular philosophy which is embodied in its charter.

Corporately OCLC has always been conscious of its daunting obligations to its membership which are encapsulated in its charter. These obligations form the backbone of its international strategy. It is a strategy designed to realise universal resource sharing and to establish an international infrastructure for its achievement. That infrastructure is a sum of national strategies designed to address national needs, cultures, standards, customs and language. This philosophy is sensitive to national information policies, aspirations for national databases and networks, the use of indigenous hardware, and the acknowledgement of national customs and standards.

OCLC's strategy is pragmatic. It requires flexibility, innovation, co-operation and collaboration. It presumes building on structures and institutions that presently exist, and it assumes to deal with a limited number of institutions and agencies in the countries it seeks to interest. Such institutions and agencies have generally been ministries of education, culture, science and technology, national library agencies, national libraries and major research and university institutions. Given these objectives OCLC is pursuing two alternative, or in some cases concurrent or sequential service models, (i) OCLC acting as a "Primary" resource centre and (ii) as a "Secondary" resource centre. In its role of Primary resource centre OCLC will market, deliver and support its extensive range of products and services directly to the end user. As a Secondary resource centre OCLC will simply deliver its products and services to a national agency which may already be responsible for the marketing and support of a similar range of products and services directly to its user community.

The concept of acting as a Secondary resource centre is a pragmatic acknowledgement of existing national automation centres which are well established, invariably publicly funded, and have the commanding allegiance of the local library community. OCLC has offered these entities a broad spectrum of its assets, both intellectual and practical, these include collaboration in research and development, the exchange of bibliographic data, an infrastructure for resource sharing, access to reference resources, and all designed to enfranchise the librarian, the patron and the scholar.

Many of the national library centres with which OCLC is working are invariably either the creator of their national bibliography or the centre for its distribution in machine readable form. The bibliographic data is frequently held in a (national) MARC format and is invariably based on ISBD (International Standard Bibliographic Description). The OCLC bibliographic database is a composite of data created by itsmember libraries in union with many national libraries including the Library of Congress, the National Library of Medicine, the National Library of Canada, the British Library, the National Library of Scotland, the National Library of Wales and the National Library of Taiwan. Soon to join this community will be the libraries of the community of PICA, in the Netherlands, the Deutsches Bibliotheksinstitut's Verbundkatalog (Monographs) and Zeitschriftendatenbank (Serials), Union Catalogues of the Federal Republic of Germany, the National Library, Portugal and the Bibliotheque Nationale.

OCLC's role in facilitating interlending on an international basis is rapidly increasing with the growing number of national interlending centres connecting into the OCLC network and resource centre. In Europe alone national centres in Denmark, Finland, France, Germany and the United Kingdom are utilising the OCLC network and database to resource share with each other and with libraries in North America and ultimately Asia/Pacific. OCLC now manages a unique and global interlending resource.

2. OCLC in Europe

Let me example these strategies. OCLC has been working closely with a number of European national libraries, research libraries and agencies during the last two years to develop collaborative programs which will realise the benefits that may be derived from international co-operation in resource-sharing.

Belgium

Two university libraries in Belgium utilise OCLC bibliographic services, the Katholieke Universiteit, Leuven and the Universite Libre de Bruxelles. The former institution is at the centre of a network which services fifteen universities, colleges, corporate and government libraries. OCLC Europe is currently negotiating with the Communaute Francaise to provide cataloguing services to twenty-four academic and public libraries in Belgium.

Denmark

The Statsbiblioteket at Arhus, which is the State Library of Denmark, utilises the interlending service, as does the National Technological (University) Library of Copenhagen. The Royal School of Librarianship also uses the OCLC System.

OCLC is planning a joint evaluation with senior members of Bibliotekscentralen. Like BTJ in Sweden, Bibliotekscentralen serves the public and school libraries in Denmark. It has a machine-readable database of bibliographic data and offers, amongst other services, shared acquisitions and cataloguing and associated products and services. The association between OCLC and Bibliotekscentralen will not simply serve the public and schools libraries but is expected to extend to the academic libraries in Denmark.

Federal Republic of Germany

The Deutsches Bibliotheksinstitut (The German Library Institute) has entered into an accord with OCLC to explore ways in which both organisations may benefit by sharing bibliographic resources.

During the phase of the accord, seven research libraries of the Federal Republic were selected by the Deutsches Bibliotheksinstitut to participate in the evaluation of the OCLC database. A similar evaluation was conducted by OCLC, in association with a number of its US member libraries, accessing the serials and monographs union files maintained at the Deutsches Bibliotheksinstitut.

Two national databases are managed by the Deutsches Bibliotheksinstitut. There is the Zeitschriftendatenbank (ZDB, Serials Database), which is being produced in co-operation with the State Library of the Prussian Cultural Foundation, and which is accessed online by over 40 libraries. The database comprises 430,000 titles, over one million holdings of more than 1,000 libraries. This catalogue is issued twice a year on microfiche. The most recently developed national database is of monographs, the Verbundkatalog. This database is comprised of about 5 million titles. It is available on microfiche, and in 1987 went online. Both databases are supported by an authority file of about 250,000 entries (the Gemeinsame Körperschaftsdatei, GKD).

The Deutsches Bibliotheksinstitut is currently evaluating the OCLC integrated library system LS/2000. The United States Army in Europe (EUSAREUR) uses the shared online cataloguing service in support of 106 libraries through Europe. Processing is done centrally at their headquarters in Heidelberg.

Finland

Helsinki University of Technology and The Technical Research Centre of Finland both utilise the interlending system.

France

An evaluation of the OCLC database conducted at the Bibliotheque Nationale and various University Libraries in Paris came to an end in June, 1986. OCLC met with senior members of the Bibliotheque Nationale, the Ministere de l'Education Nationale (DBMIST) and the Direction du Livre et de la Lecture in Paris during 17-18 July, 1986 to discuss the next phase of co-operation. An accord was concluded which has resulted in the following actions being taken:

1) An agreement has been concluded with the Bibliotheque Nationale for the use of the OCLC interlending service by the Centre de Pret.

2) The conclusion of an agreement to enable the 65 libraries of the Universities of France to utilise the shared online cataloguing service.

3) An agreement was concluded with the Direction du Livre et de la Lecture, to undertake an evaluation of the OCLC database at the Bibliotheque Publique de Massy, the Bibliotheque Publique de Rouen and the Bibliotheque Publique d'Information (the library at the Pompidou Center).

4) Joint R&D programme with DBMIST.

Two corporate libraries and a college library (the American College in Paris) also use the shared online cataloguing service.

Netherlands

Bibliotheek automatisering (PICA) has entered into an accord with OCLC to share bibliographic resources. An evaluation of the OCLC database has been completed. The libraries participating included two public libraries, two university libraries, the Royal Library and the Dutch Bibliography. PICA manages a national network and bibliographic database online, serving the majority of academic and public libraries in the Netherlands. It is housed in the Royal Library which it also services. An agreement to exchange bibliographic data is about to be concluded.

Spain

The University of Barcelona has recently started to use the MICROCON service. This is the first phase of a library automation project which will include retrospective and current catalogue processing. Exploratory talks have been opened with National Library of Spain. A joint evaluation by six libraries in Catalonia will start in January, 1988.

Portugal

The National Library of Portugal will this Autumn evaluate the value of the OCLC database for its own catalogue conversion programme and that of the public and university libraries in Portugal.

Sweden

In August, 1986 OCLC concluded an agreement with Bibliothekstjänst AB (BTJ) to utilise the OCLC union database online. BTJ services the public and school libraries of Sweden. It provides a comprehensive book purchasing, binding and stock control service to its member libraries. These services include the maintenance of a union catalogue online which is used as a resource for catalogue production, interlending and circulation control. All original cataloguing is done by staff at BTJ on behalf of the member libraries.

The University, College and Research Libraries in Sweden are served by a national network and bibliographic database which is managed as a co-operative named LIBRIS. LIBRIS has recently agreed to participate in an evaluation of the OCLC database. The evaluation will be conducted at a number of university libraries over a period of six months.

The World Maritime University Library which is located in Malmö already uses the shared online cataloguing service.

Switzerland

The corporate library of Dow Chemical Europe, based in Switzerland, uses the shared online cataloguing service.

OCLC has embarked upon an evaluation of systems and services with REBUS (Reseau de Bibliotheques utilisant SIBIL [Systeme informatise pour Bibliotheques Universitaires de Lausanne]).

United Kindom/Republic of Ireland

Over 50 academic and research libraries currently utilise OCLC services in the United Kingdom and the Republic of Ireland. These members include The British Library, the National Libraries of Scotland and Wales, the National Art Library, seventeen university libraries, nineteen colleges and ten corporate libraries.

OCLC works closely with the British Library Research and Development Department appraising research programs, with the British Library, Bibliographic Services Division in the exchange of MARC data and in support of their Record Supply Service, and with the British Library Document Supply Centre in reciprocal interlending service between Europe and North America.

OCLC has a growing relationship with the regional (interlending) library bureaux in the United Kingdom. OCLC is participating in the VISCOUNT project which is managed by LASER (London and South Eastern Region), funded by the British Library, Research and Development Department, and which includes the North West Regional Library Bureau, the South West Regional Library Bureau, the British Library Document Supply Centre and the National Library of Scotland. The OCLC database is being evaluated as a secondary bibliographic data resource.

During the last two years OCLC has worked actively with the CURL libraries (Consortium of University Research Libraries - the universities of Edinburgh, Glasgow, Leeds, Manchester, Oxford, Cambridge and London) in evaluating the extent of the task to convert retrospectively their collections and the role that OCLC might play in assisting them in that task. A descriptive inventory of their individual collections was commissioned jointly by OCLC and CURL which is soon to be published.

Vatican

The Vatican Library in association with OCLC has commissioned a study of its collections which will be similar in approach and scope to that carried out in association with the Consortium of University Research Libraries in the United Kingdom. The intention of this study is to identify and qualify the collections and to consider their value to the scholarly community worldwide.

A MICROCON project has just been completed at the VaticanLibrary.

3. Research and Development at OCLC

Mr. Chairman, may I now move to the second part of my paper. Let me now describe to you some of the exciting research and development work being undertaken by OCLC. Some of the products under development have been discussed at past symposia, for those who have attended those past meetings allow me to provide you with an update.

(i) GRAPHTEXT

As many of you will know GRAPHTEXT is a group of applied technologies that create, retrieve, display, and print databases containing full text journal articles, including tables, figures, and other graphic images. Documents displayed or printed resemble the original publications in format and typeface. Databases are generally created from existing machine-readable files and displayed on bit-mapped display and printing devices.

GRAPHTEXT has an open system architecture that uses well-defined file formats for communication between modules. The system provides control over all aspects of full-text database creation, including indexing, typesetting, and positioning text on an output device (screen or printer). OCLC conducted a field test of the GRAPHTEXT system to assess performance and obtain user reactions. The test was conducted from August 1986 to January 1987 at ten test sites. Each test site received a microcomputer, a compact disc drive, and a laser printer. The test database consisted of 1,232 articles (over 6,000 pages) from 20 issues of Inorganic Chemistry and 10 issues of Organometallics provided by the American Chemical Society.

Preparation of the field test database demonstrated the feasibility of large-scale translation of typesetting tapes that include tables, equations, and graphics. Additionally, it provided OCLC with improved estimates of personnel time, processing costs, and storage requirements. Implementing the test provided valuable field experience with the equipment and an opportunity to develop co-operative relationships with publishers.

(ii) Electronic Information Delivery Online System (EIDOS)

Again as many of you are aware EIDOS is a comprehensive data, information, and knowledge supply system operating electronically on computers over telecommunication circuits and accessed from various types of equipment used as terminals. Users of EIDOS will be information seekers in homes, offices, schools, colleges and universities, and libraries. Sources of information will be in electronic form and will comprise books, journal articles, archives, and maps; other sources, not now generally available, will be lectures, television programs, radio programs, and community information. Initially, only books in machine-readable form, as by-products of electronic publishing, will be available from EIDOS.

The first stage in the development of EIDOS will be the construction of a pilot system.

At the present time, OCLC is working on the system design. Activities to date represent progress made that can be applied to the development of the pilot system and these include:

Database preprocessing programs for the Pentatypesetting system are written.

Text editing software for cataloguer/editors to add page numbers, etc. is almost complete.

SGML tags to be embedded in EIDOS documents have been defined.

Experimentation with screen design and system navigation has been done.

Experimentation with graphics loading, compression,and displaying has been done.

Experimentation with text indexing, compression,and retrieval has been done.

Potential textual database designs have been outlined.

Contact has been made with thirty publishers to obtain books in machine-readable form. We are presently receiving tapes from six publishers.

Our current plans call for testing of the pilot system in approximately fifteen months.

(iii) Reference databases on CD-ROM (SEARCH CD450 System)

OCLC's new reference product, the Search CD450 system, provides access to reference databases stored on compact discs. Compact discs accommodate large files of information that can be retrieved using a microcomputer, a CD-ROM (Compact Disc Read Only Memory) reader, and OCLC search software. Compact disc technology provides local access to information, reduces time-based telecommunications and search charges, and uses a very reliable medium for information storage. With the new OCLC Search CD450 system, patrons and staff will have affordable inhouse access to many reference databases.

The OCLC Search CD450 system includes sophisticated, easy-to-use search software that will allow patrons and staff to take full advantage of reference databases in the library. In addition to local data access, the Search CD450 system allows local profiling so that library staff can alter options for searching, display and printing.

The OCLC Search CD450 system will run on:

* An OCLC M300 PC6 Workstation or IBM PC XT or PC AT, each with at least 512K random-access memory(RAM)

- A 10MB fixed-disk or hard card

- A CD-ROM reader

The Search CD450 education package includes three databases on five separate compact discs.

1) ERIC database, 1982-present. (Quarterly or annual subscription).
Includes two separate files:
- Current Index to Journals in Education (CIJE), 1982-present.
- Resources in Education (RIE), 1982-present.

2) Current Index to Journals in Education. 1969-1981.

3) Resources in Education. 1977-1981.

4) Resources in Education. 1967-1976.

5) Education Materials in Libraries. A subset of the OCLC Online Union Catalogue containing education-related bibliographic records representing all types of materials. (Annual subscription).

(iv) Compact Disc Cataloguing System (CAT CD450)

OCLC is currently developing a microcomputer-based cataloguing system that uses a subset of the OCLC Online Union Catalogue on compact disc. The Compact Disc Cataloguing System offers a library expanded capabilities but avoids significant communications costs.

Subsets of the OCLC Online Union Catalogue are produced on compact disc. This database may be searched by the following elements, individually or in combination: author, title, OCLC number, ISBN, ISSN, LCCN, government document number, music number, publication dates, reproduction, language, subject headings and cataloguing source.

Records retrieved may be edited, new records may be created and spine labels and catalogue cards may be produced locally.

When a record for an item to be catalogued is not found on the compact disc, the user has the option to search the OCLC Online Union Catalogue and download bibliographic data.

Approximately 700,000 bibliographic records and their indexes will be distributed on each compact disc. Based on an extensive study or record usage in the Online Union Catalogue, these subsets, designed to provide high searching hit rates, are being considered for the initial distribution of the system: (1) records of books most frequently used with imprint dates of 1980 to the present, including both LC and non-LC records; (2) most-used nonbook records (all formats) plus book records with pre-1980 imprint dates; and (3) all LC Name- and Subject-Authority records. The number of discs per subset may vary. Subsets for libraries needing special types of materials, such as law and medical libraries, or libraries of the nations of Europe as well as additional subsets of nonbook materials are being considered for future releases based on user needs.

These new products, in association with the range of already well established products and services, offer an armoury of opportunity for the library communities of Europe to share.

Thank you Mr. Chairman.

AUTOMATED LIBRARY NETWORKING IN NORTH AMERICA: NEW REALITIES, MAJOR TRENDS

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AUTOMATED LIBRARY NETWORKING IN NORTH AMERICA: NEW REALITIES, MAJOR TRENDS

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Abstract

The four traditional bibliographic utilities (OCLC, RLIN, WLN, and UTLAS) no longer dominate the library automation environment in North America. At almost every dimension of the computerized library service and networking environment, major, fundamental structural and functional changes have occurred in the 1980s. The four North America bibliographic utilities are still major participants in the library automation and networking environment today, but almost everything in that dynamic environment has changed, including the utilities themselves.

Three factors account for this change: 1) microcomputers, which enable libraries to accomplish locally what once could be achieved on by joining with others, 2) the preference of librarians for the autonomy afforded by a local system, and 3) the wide availability of services and products provided by the private, commercial sector that compete with the network (utility) services.

New "players", new technologies, more knowledge and skilled librarians, and new networking models and configurations have led to radical changes in the basic network structure among libraries in North America. With the addition of new participants who have in many areas taken the initiative and leadership away from the utilities, the pattern of development of library automation and its adoption by librarians has also changed.

Two grand visions still alive in 1980 are now completely dead ideas: 1) the concept of a national bibliographic network, and 2) the dream of a network-based "total library system" developed and operated centrally by one of the bibliographic utilities.

Efforts to establish a national network have been replaced by calls for greater voluntary coordination and cooperation among the major, independent utilities in the U.S. The very

notion of a "national network" has now been replaced in discussions with the reality of "nationwide networks". The Linked Systems Project (LSP), a program to link the computer systems of LC, RLG/RLIN, WLN, and OCLC, utilizing standard communications protocols to create an "open systems interconnection" environment has materialized to become the major cooperative networking effort at the national level ("across the top") in the U.S.

The increasing availability of affordable turnkey local library systems and supported software supplied by commercial vendors from 1980-1987 has had this result: the locus of initiative and influence on determining the direction of library automation and networking shifted from the bibliographic utilities to the commercial vendors of local systems, and to librarians more interested (and now better qualified) in using the new commercial systems and software to solve access and resources sharing problems closer to home. The bibliographic utilities were slow in developing and marketing local library automated systems. This fact accounts in part for the structural and functional changes in the automated networking environment. Competition and new products from the commercial sector have provided librarians more sources for automated systems and services. Functions formerly automated at the network level are being distributed and supplied to the local level.

To understand the changing environment of computerized library networking and automation in North America, it is necessary to gain some insight into its dominant themes: decentralization and commercialization, a resurgence of regionalism and local initiative, and the democratization of computer expertise in the application of new information technologies to library functions and activities. As themes are played-out, a new pluralistic, multi-layered library networking environment is rapidly emerging.

No single model of computerized library networking will suffice to adequately characterize current library networking and computer-based resource sharing activities in th U.S. and Canada. The networking environment today is decentralized, multi-layered, increasingly populated at the local level with distributed processing systems, and resplendent with a resurgence of local, grassroots networking and linking initiatives. Local, state, provincial, and regional bibliographic databases supported by a variety of computer systems are populating the library landscape in North America. A wide variety of computer networking and linking arrangements can be found for sharing cataloguing, holdings, and reference information resources.

AUTOMATED LIBRARY NETWORKING IN NORTH AMERICA: NEW REALITIES, MAJOR TRENDS

Introduction

At the beginning of the decade OCLC, RLG/RLIN, WLN, and UTLAS dominated the library automation scene in North America. Among these four "bibliographic utilities" (as the organizations that operate computerized library networks are commonly called), each of which utilized a centralized bibliographic database, OCLC was the largest and most influential. Since most libraries' first experiences with automation involved joining one of the utilities to acquire online cataloguing and interlibrary loan (ILL) services, the utilities exerted the major influence on the pattern of library automation and networking development into the early 1980s. Most of the computer terminals in libraries in 1980 were dedicated terminals connected solely to the remote, central computer system of one of the four utilities. Each utility stood alone, operating separate and unlinked private telecommunications networks to connect its member or client libraries to its centralized processing facilities and database.

By 1980, OCLC, RLG/RLIN, WLN, and UTLAS had brought online computer technology, through their shared cataloguing systems, to thousands of libraries in North America. Some viewed this networking development as a culmination, as the case "par excellence", of applying computer technology to library functions. Others, more visionary, saw it as merely the beginning, the foundation of the coming pervasive use of diverse new technologies in libraries, including entirely new solutions to the problem of providing affordable and effective computerized networking systems for libraries.

At the risk of oversimplification, it suffices in this introduction to say that the major, most influential "players" in the library automation and networking world of 1980 were the four large, centralized utilities and their supporting service centres. Indeed, Martin (1) observes, "In that time, it was difficult to discuss library automation without mentioning library networks or vice versa. Even libraries with local systems usually required a link to a bibliographic utility and its database". The utilities were the first to introduce automation into very large numbers of North American libraries, and thereby, to demonstrate its efficacy. The cost-effective support of utility-based automated cataloguing and electronic ILL activity was well-established in 1980, and serials control, union listing, and acquisitions systems were either operational or undergoing testing and development by the utilities. The dream of a centralized, total library system was still alive (including even the local function of circulation control supported on the remote computer system of the utility). In 1980, the governors and managers of the utilities gave little thought or direction to the opportunities inherent in local, distributed library computer systems and the interlinking of their separate, large-scale computer systems and databases. Furthermore, "integrated library systems" (ILS) and "online public access catalogues" (OPACs) were not familiar phrases in the common parlance of library networkers.

With a welcome touch of realism (perhaps the benefit of hindsight), Malinconico (2) reminds us that "the development of computerized bibliographic networks in North America has been the result of pragmatic responses to prevailing circumstances, not the logical consequences of coherent strategies or grand designs". He goes on to say that the services they provide and the manner in which they are organized is determined by economic realities, current technological capabilities, and the "urge toward self determination". I would add that librarians' demands for new services from the utilities also play a determining role in the provision of services and products. If the demands (e.g., for subject access to library collections and OPACs) go unheeded long enough, librarians will turn to suppliers other than the utilities for these services and products. Unfortunately, until recently, as Markuson (9) documents, library networkers have designed and implemented models of networking that optimize bibliographic control rather than facilitate bibliographic access through advanced computer technology, and have developed systems that serve the needs of librarians more effectively than the needs of library users.

Making the same point in her critique of centralized bibliographic networks and electronic union catalogues - namely that librarians have concentrated their efforts on the creation and processing of bibliographic records in ever larger systems, utilities, and union catalogues - Beckmann (3) cites the comments made by Bregzis (National Librarian of Canada) and Wright in 1979:

> The original objective, to harness technology for the benefit of the information user, was soon displaced by the substitute and less complex objective to apply technological innovation to the manipulation of bibliographic records.

The perceived requirement of librarians for more cost-effective bibliographic control, plus the marriage of the mainframe computer and machine-readable cataloguing records, largely explains the golden era of the development of the large bibliographic utilities and their centralized processing centres.

Networks in Transition: the Eclectic Computerized Library Networking Environment of Today

The four North American bibliographic utilities are still major participants in the library automation and networking environment today, but almost everything in that dynamic environment has changed, including the utilities themselves.

Martin (1) summarizes the dramatic change in the automated networking environment with this passage:

> With the more conservative political and economic climate of the country, libraries have shifted from the enthusiasm of total cooperation to a strong support of local systems with a more cautious embrace of the cooperative.

Martin identifies three determining factors responsible for this change: 1) microcomputers, which enable libraries to accomplish locally what one could be achieved only by joining with others, 2) the preference of librarians for the autonomy afforded by a local system, and 3) the wide availability of services and products provided by the private, commercial sector that compete with the network (utility) services.

New "players", new technologies, more knowledgeable and skilled librarians, and new networking models and configurations have led to radical changes in the basic network structure among libraries in North America. With the addition of new participants who have in many areas taken the initiative and leadership away from the utilities, the pattern of development of library automation and its adoption by libraries has also changed. Two grand visions still alive in 1980 are now completely dead ideas: 1) the concept of a national bibliographic network, and 2) the dream of a network-based "total library system" developed and operated centrally by one of the bibliographic utilities.

Most medium and large public and academic libraries in the U.S. have installed computer systems to automate circulation functions and local catalogue maintenance. Many have also automated one or more of serials control, acquisitions, and the public access catalogue. Most formal plans for acquiring a local automated library system now specify a multi-function, integrated library system (ILS) that can be operated entirely at the local site. Typically, these integrated library systems are minicomputer-based and are supplied as "turnkey" systems by commercial vendors. In addition, microcomputer systems and products are flooding the entire library community. They are bringing significant computer processing power to even the smallest of libraries.

In the early 1980s, the locus of initiative and influence in determining the direction of library automation and networking shifted from the bibliographic utilities to the commercial vendors of local systems, and to librarians more interested (and now better qualified) in using the new commercial systems and software to solve access and resource sharing problems closer to home. De Gennaro (4) documented this trend toward the "rapid proliferation of a variety of powerful and versatile mini- and microcomputer systems in individual libraries and clusters of related or affiliated libraries". By 1980, several commercial firms like CLSI and GEAC had brought to market affordable turnkey local library systems. "Turnkey" systems represent an arrangement whereby a single vendor provides all the software and hardware for the functions to be automated and assumes the responsibility for system installation and maintenance. Most of the early turnkey installations were circulation control systems, and they provided librarians the opportunity to use automated technology in their own environment to exercise control over the materials in their collections.

Malinconico (2) reminds us that in the late 1970s and early 1980s, "the bibliographic utilities entirely missed the opportunity to develop and market turnkey systems". This fact accounts in part for the structural and functional changes in the automated networking environment. Competition and new products from the commercial sector have provided librarians more sources for automated systems and services. Functions formerly automated at the network level are now being distributed and supplied to the local level. As a result, a larger number of librarians at all levels have become sophisticated in their knowledge of computer technology applied to local library functions and resource sharing activities, such as interlending and reciprocal borrowing practices, based on shared or linked automated circulation systems.

Recent decisions by the utilities to market mini- and microcomputer-based systems, and to distribute some of their traditional network-based functions to the local IBM PC-based workstation, may be viewed as an attempt to regain their former position of dominance and leadership in the library automation and networking environment. More likely it is a rational approach to remaining viable in a dynamic and highly competitive marketplace. However, in this new decentralized environment, two trends (at least) are irreversible: more and more computer processing power will be brought within the budget range of all sizes of libraries, and librarians will increasingly be driven by the urge toward self-determination and control to exploit locally available technology to solve local problems.

Libraries no longer need to join large networks to get benefits of automation. The automated services and products provided by the utilities will be purchased by libraries only if they are competitive in quality and price. The role and functions of the large utilities in today's decentralized and commercialized library automation and networking environment are undergoing rigorous reexamination within the library community.

To understand the changing environment of computerized library networking and automation in North America, it is necessary to gain some insight into its dominant themes: decentralization and commercialization, a resurgence of regionalism and local initiative, and the democratization of computer expertise in the application of new information technologies to library functions and activities. As these themes are being played-out, a new pluralistic, multi-layered library networking environment is rapidly emerging.

Decentralization and Commercialization of the Networking Environment

In their 1980 state-of-the-art review of new networking technology, Avram and McCallum (5) observed that "the most significant point about this new technology is that after pulling the community toward large centralized facilities for 10-15 years - in order to use large machines with accompanying economies of scale - it is now pushing toward decentralization". The authors had in mind primarily the new technology of very large scale integrated (VLSI) circuits which made possible very powerful mini- and microcomputers at greatly reduced costs.

From a broader perspective, Segal (6) argues that networking efforts in the library world have always been shaped by two sets of countervailing forces: forces pulling toward centralization, and forces pulling away from it.

Forces driving toward centralization include:

1) the desire to build large databases to provide universal or "global" electronic union catalogues,
2) the perceived need for national or international holdings data to support interlibrary loan activities,
3) the need to impose and maintain standards,
4) the availability of inexpensive telecommunications and advanced technology,
5) the proliferation of machine-readable records, and
6) the reduction in costs achieved by a reduction in duplicate efforts.

Forces pulling away from centralization include:

1) fear of the loss of autonomy and the urge for self determination,
2) an increase in telecommunications costs,
3) technological advances in distributed computer processing (e.g., powerful mini- and microcomputers), and
4) increasing costs and overhead associated with acquiring and supporting network services.

De Gennaro (4) believes these countervailing forces explain the existence of two parallel and sometimes conflicting lines of development in the history of library automation: one focused on local systems, the other on network systems. He believes that in the 1980s these two lines are coming together in a "synergistic way":

> The interest, energy and resources that went into network building in the 1970's are now going into buying and installing mini- and microcomputer-based local systems.... These local systems may eventually acquire the capability to link to each other and to the utilities for shared cataloguing and ILL purpose.

The latter promise has been realized. Growing numbers of libraries in North America have been able to afford and install multi-function local systems. Commercially-supplied turnkey systems have become more reliable and acquiring support directly from the vendor has made them attractive to librarians. Vendors acquired experience early with providing local systems and support services, such as retrospective conversion, local database maintenance, etc. And now they are providing systems capable of supporting groups of libraries in local clusters or state-wide network services. As Malinconico (2) observes, "the result has been a decreasing dependence on shared (remote) computer facilities, and increased instances of cooperation carried out on a small scale, among libraries with a very high affinity of interests" (or I might add, with a very close proximity to one another).

Vendors have had a major impact on the library environment greater than that of the utilities in the 1980s. They have exploited low-cost minicomputer technology and have offered libraries affordable turnkey automated systems: systems which include all hardware, software, installation, training, and on-going support from a single source. Unlike OCLC (in its role as a remote utility), they became directly involved with library management and staff, and proved to be more responsive than OCLC to demands for new design features, such as online subject access and authority control. By quickly upgrading their systems to take advantage of the expanded power and flexibility of superminicomputers, turnkey system vendors will continue to shape the pattern of library automation development. The massive processing and storage capacity of the new multi-processor systems provide the capability of supporting multi-functional, integrated library systems (in which a single bibliographic file supports all functions) for large public and academic libraries, or even local or state-wide library consortia. As Boss (7) observes: "The sharing of systems based on large minis may not reduce the costs of automating, but it will facilitate resource sharing in local areas". Shared or linked local automated circulation systems are able to provide precise, timely, online information to staff and patrons regarding the status of materials in all the linked collections.

OCLC and UTLAS have recently begun to compete with the turnkey system vendors by marketing their own integrated library systems. This development, plus that fact that UTLAS is now owned by a for-profit international corporation, may have a far-reaching impact on the way libraries perceive and do "business" with these utilities. Martin (1) points out that more and more the large utilities "are increasingly viewed as vendors that are vying for the library's business rather than as partners in an effort to reach a common goal". The logic and motives involved in doing business are different than those required for shared, cooperative efforts. A business relationship is by its very nature more transient. Contracts replace shared commitment and reciprocal loyalty. If a new vendor offers better services at less cost, the library customer is likely to change vendors. In its recent expansion of its network and services into the U.S., UTLAS undoubtedly has this possibility in mind. One must conclude, however, that this increased competition in the library systems marketplace has provided more kinds of options for automated services to libraries in North America.

It is too early to measure the impact of this decentralization and multiplicity of options on the traditional bibliographic products and services provided by the utilities. But trends can be anticipated. Even two years ago Boss (7) reported that:

> The development of local, integrated, multi-function systems has led a number of libraries to limit the role of their bibliographic utility to that of a resource database supplier. After obtaining a machine-readable record from a utility's database, many libraries do all subsequent searching and editing locally. As interfaces are developed among the local library systems in a region, the use of the utilities' databases for interlibrary loan also changes. Already some libraries use the utilities' ILL subsystems only to access out-of-state locations.

The number of commercial suppliers of bibliographic records has exploded in recent years, and some are offering optical digital disc-based cataloguing systems at prices far lower (per unit) than those incurred in using a utility.

Regionalism and Local Initiative

During this period of decentralization, library resources and efforts to apply new information technologies to library functions are being redirected to the local level of the library community. Medium and large libraries are installing (or planning to install) turnkey integrated library systems. All libraries, large and small, are purchasing a diverse variety of microcomputer software products and are using it for a variety of local administrative and resource sharing needs.

This trend toward decentralization and local initiative must not be seen as a reduced commitment to cooperation and resource sharing among libraries. Librarians are very much aware of the continuing need to share limited resources, and maintain a professional allegiance to cooperative goals and programs. The former enthusiasm for national or large centralized networking activities has clearly diminished, and may not exist at all as a common spirit in the U.S. As De Gennaro (4) predicted, librarians have moved to regain the control over much of their technical operations that they gave up to the utilities in the 1970s. They have learned that "they cannot be totally dependent on external and sometimes fragile technical systems over which they have little or no control". Transferring responsibility for key library functions to external agencies is not appreciated or understood by the local political and governing bodies that support and oversee their libraries. With the rapid proliferation of turnkey systems and wide availability of microcomputers and software, librarians are shifting their priorities to the development, maintenance, and extended use of their own automated local circulation systems, machine-readable databases, and online public access catalogues (OPACs).

There is no need for alarm or pessimism. Resource sharing and networking activities are not diminishing. We are witnessing a return to the local, "grass roots" level of networking, using a variety of local computer-based technologies and arrangements. Robinson (8) reminds us that networks began as grass roots organizations, and probably "ought to remain so"". In her report to LC's Networking Advisory Committee (NAC), Markuson (9) argues that local network interests should retain their primacy. The wide access to interlibrary information in the U.S. has been based on local funding and local initiative:

> The reality is that the majority of library collections, services, and access are provided by local, not national, agencies using local, not national funds, and that any extended access to these local collections has come about through professional cooperation and operational necessity. The reality is that our tremendous system of nation-wide access to library holdings would stop dead in its tracks without constant local commitment and financial support.

It must be said that librarians in North America have no natural desire to engage in expensive, .computer-based cooperative activities on a large scale, across vast geographical distances. The need for local control and the urge for self-determination position them against remote, centrally controlled and administered networking organizations, whether they are private or public, for-profit, or not-for-profit. Librarians did not, upon shared deliberations and driven by a positive spirit of cooperation, join together in the 1970s to develop large, centralized, nation-wide bibliographic networks. The utilities provided the technology of the day; the incentives to join were largely economic or of "operational necessity". Experience is teaching us once again that librarians' commitment to operational cooperation is inversely proportional to the geographical and political distance separating the participants, and directly proportional to the natural or logical affinity of group interest and goals.

Most libraries cannot satisfy all their patrons' needs from their own stock. Thus, resource sharing is very much alive. But for many libraries this need can be satisfied with an arrangement to share resources with libraries in the local vicinity or within the state or province. Malinconico (2) speaks of the emergence of computerized mini-networks. More and more small groups of cooperating libraries are purchasing one or more systems from a single vendor. Whether through sharing a common database or through the vendor-supplied linking of the separate systems, such "clustered" systems support either reciprocal borrowing agreements or interlibrary lending. Bibliographic records already in the database can be adapted and used by libraries in the local group to catalogue new acquisitions, making it possible to bypass the utility's network. An example of this can be found in a group of public libraries in Cleveland, Ohio which use turnkey systems supplied by Data Resources Associates (DRA). The systems are linked together using the vendor's DRANET linking and datacommunications facilities.

Several state library agencies have instituted plans to select a single commercially-supplied, multi-function turnkey system to serve as the basis for a state-wide resource sharing network. Either through incentive funding or legislative mandate, systems are acquired and installed at the libraries within the political jurisdiction. The separate computers and databases are linked via a variety of telecommunications technologies, including cable and microwave. Examples include the use of VTLS (Virginia Tech Library System) in the West Virginia State Library Network, and the decision to install GEAC systems in Indiana's public libraries.

Other libraries in a region, within a state or across state boundaries, are joining together voluntarily to share a powerful, locally-developed network system and its database storage and circulation control capabilities. Local catalogue records are typically tape-loaded into the central system, but direct entry is being planned. The central computer system may have been developed originally by a single university (as is the case with the Illinois Statewide LCS System), or by a college and university consortium, for example, CARL, the Colorado Association of Research Libraries, and TRLN (Triangle Regional Library Network) in North Carolina. In two of these cases, (CARL & LCS) public libraries have been included in the state network systems. In other local regions, commercial vendors have supplied cataloguing, circulation, and ILL systems to small groups (often newly formed) of libraries. In some cases, these locally developed or installed systems are replacements for a utility. In other cases, the utility still serves as the resource bank for the local, automated cooperative.

Two other "local" networking developments that must be mentioned are 1) the increasing use of mini- and microcomputer communications and ILL software to support interlending among libraries within a state, province, or local consortium, as an alternative to using the utilities' ILL systems, and 2) the integration on large university campuses of the library's automated system via a local area data communications network (LAN) with the wider computing environment of the university community. Access to the library's system and resources through the OPAC is thereby provided to anyone having access to the larger network on the "wired campus". When linkages to other local, regional, and national online information systems are established, the library will have the opportunity to position itself in the university environment as a gateway to diverse information resources, and as the primary provider of access to local, national, and international information. The impact of this development on the utilities is not yet visible, but leaders at both OCLC and RLG are carefully analysing this growing phenomenon as part of their strategic planning activities.

The Democratization of Computer Literacy and Expertise

Librarians in ever-increasing numbers are both contributing to and benefiting from the decentralization occurring in the library automation and networking environment. Not many years ago, the broad "rank and file" of librarians has little exposure to, or training in, computer and communications technologies. Before the 1980s, few libraries had computer systems in-house. Individuals possessing both knowledge of library operations and computer expertise as applied to library functions constituted a small, informal elite in the library profession.

This is no longer the case, as we have witnessed in North America what can be characterized as a democratization of computer literacy. Among librarians, this spread in knowledge and competence with library computer systems and applications occurred gradually in the 1970s and 1980s. Three major, evolutionary contributing factors can be identified. They represent conditions that have appeared successively with some overlap over the years, and that together have had a progressively propelling impact on the increase of technological sophistication and computer expertise in the professional library community.

One of the positive consequence of the success of automated bibliographic utilities and networks, as Malinconico (2) points out, is that thousands of librarians gained first-hand experience with new computer technologies. Even in library schools, the first lessons in automation typically involved training on the use of a utility's terminal. Malinconico observes that, as a result, an increasing number of librarians "have developed a sophisticated understanding of the potential of library applications of computer and telecommunication technologies". They are, thus, a motivated force working vigorously for the implementation and improvement of the services.

The second factor responsible for the increased technological sophistication among librarians is the rapid proliferation of local multi-function turnkey systems in libraries since 1980. This development has brought entire computer systems, not terminals alone, into large numbers of libraries. As a result, librarians have become very literate and comfortable with regard to computer technology. Furthermore, a new professional specialty and role has emerged for librarians who wish to assume responsibility for the management, coordination, and operation of local library systems. These specialists, also growing in number, are variously called "systems librarians", "automated systems coordinators", etc. These librarians constitute a highly trained, progressive force for change on today's library community.

The third factor is the microcomputer revolution sweeping across all professional and business sectors of the U.S. and Canada, including libraries. Hundreds of thousands of microcomputers have been acquired by American libraries. Hundreds of microcomputer software products for library functions are available in the marketplace. Unlike the dedicated turnkey system, micros can be found in all corners and units of the library. It is the pervasiveness of microcomputers throughout the library that has completed the democratization process. They are now common tools in the administrative offices of libraries; they are used to support or back-up a variety of "housekeeping" functions, from cataloguing to circulation management activities, and they are increasingly being introduced in public service areas as OPACs or "end-user" reference search stations.

Librarians are learning to select and use off-the-shelf microcomputer equipment and software, both for their own needs, and for new services to their patrons. Many libraries provide public access microcomputers and software for on-site use. Therefore, many librarians have acquired computer education and training skills to support this new service.

This democratization of library computer knowledge among librarians is having a major impact on the ways new information technologies are being put to use in libraries and networking activities. Uses range from managing administrative tasks (e.g., budgeting, statistics, report generation) to improving patron access to library information files. Micros have enabled (rather, empowered) the librarian to take automation directly to library and information users.

No longer is there a concentration of computer knowledge resources or leadership in the organizations of the utilities and a few universities. At the beginning of the 1980's, most librarians were passive network participants. They were involved in library bibliographic networks primarily as recipients of the utilities' services and products. Today, more librarians across the U.S. and Canada are active network creators and managers, using local turnkey systems and micro-based ILL and communication software for local and regional resource-sharing programs and activities. In the last 2-3 years, local system vendors have created linking and networking software for their products, in response to demands from librarians in local institutions and local library consortia. Local initiative and the urge for self determination and autonomy are forces network planners and coordinators in North America will have to reckon with as never before, now that affordable, flexible information technology is making its way into all areas of most of our libraries.

A Pluralistic Mosaic of Networks and Cooperative Activities

No single model of computerized library networking will suffice to adequately characterize current library networking and computer-based resource sharing activities in the U.S. and Canada. The networking environment today is decentralized, multi-layed, increasingly populated at the local level with distributed processing systems, and resplendent with a resurgence of local, grass roots networking and linking initiatives.

It is no longer accurate, if it ever was, to hold up OCLC's centralized star-configured network system of the early 1980s as the paradigm of library networks in the U.S. Clearly, the "big four" utilities are still major forces in the library automation and networking environment. However, in today's competitive, mixed library market environment, the utilities no longer dominate in the development and distribution of automated products and services. It is easy to make a case that they have lost the initiative (at least temporarily) in introducing new technology and computer-based support services into libraries. Other commercial organizations are leading the way with the introduction of turnkey, multi-processor, integrated local systems, networking software, advanced OPACs, and optical disc, microcomputer-based end-user reference systems. While continuing to grow by most measures (e.g., database size, online terminals, member/client libraries, etc.) and in combination serving thousands of libraries in North America, each of the four large utilities differs in significant ways from the others. Furthermore, OCLC, RLG/RLIN, and UTLAS are pursuing their separate plans for decentralizing their networks and exploiting distributed processing in ways they deem viable and otherwise in their best interests.

Since the late 1970s, library leaders in Canada have advocated the development of "an electronic decentralized nationwide library and information network" for their country (10). They have been very vocal and visible in their opposition to a centralized, nationally administered network for Canadian libraries. At times, they have proudly set themselves apart from, if not above, the national leadership and "policies" of the U.S. library networking community. In the late 1970s, the Canadians perceived quite correctly that in the U.S. a push for a centralized national bibliographic network was taking place at high levels, and that in reality, OCLC with its centralized system was rapidly becoming the de facto national network.

The Canadians steadfastly opposed both developments, and pursued their own policy of developing a decentralized network configuration in which hundreds of different library computers and databases across Canada would be linked in an open systems environment, based on the developing ISO/OSI standard protocols for connection and communication between different computer systems. The National Library of Canada, through its Office for Network Development, assumed the role of coordinator of OSI standards development and system interconnection pilot and field tests, such as the well-known 1981-82 iNet field trial. It was foreseen that the National Library's DOBIS-based union catalogue database at Ottawa would be a major, but not the only, node in the Canadian library network.

Ironically, most of the reasons listed by Durance, Director of the Office for Network Development, to explain Canada's rejection of a centralized network approach apply equally well to the U.S. (10). Rationalism aside, actual networking developments in the U.S. are bringing reality closer to the Canadian wish. U.S. library leaders in the bibliographic utilities have reached near unanimity in their support for the implementation of ISO/OSI protocols. The Linked Systems Project (LSP) undertaken by RLG, WLN, OCLC, and the Library of Congress is an outstanding example of this commitment to OSI-based open systems interconnection, although this program is correctly viewed as a "linking across the top" by other participants in the U.S. library networking environment.

Commercial vendors and state and regional networkers are viewing this development (LSP) with caution. Centralized, "top down", national coordination of the new "open" nation-wide bibliographic network by LC, CLR (The Council on Library Resources) and the three large U.S. utilities is likely to meet as much resistance from the commercial sector and the "grass roots" as did earlier plans to create a national network. In their enthusiasm for expanding the library applications and scope of the LSP project throughout the library community in the U.S. and Canada, the LSP leaders run the risk of being perceived as elitist "officials" (self-appointed) handing down policy from the top. The current environment is not hospitable to that approach. It should be pointed out that the current LSP National Policy Committee, which is extending the scope of its efforts to include all segments of the computerized library networking community, has no members representing public libraries, smaller academic libraries, or the commercial library system sector.

Summary .

Local, state, provincial, and regional bibliographic databases supported by a variety of computer systems are populating the library landscape in North America. A wide variety of computer networking and linking arrangements can be found for sharing cataloguing, holdings, and reference information resources. As Markuson (9) says, "New technology now allows us to pose many alternative network models from highly centralized to highly distributed systems". In his landmark 1983 paper, De Gennaro (4) observed the reaffirmation of local autonomy which was producing local and regional networking arrangements to "supplement, modify, or even supersede the familiar star networks (utilities)". He predicted correctly that the utilities' networks, regional, state and local online catalogues would be linked and coordinated in a variety of ways:

> There will be no single hierarchical National Library Network in the U.S.; nor will there be a central government agency planning and directing the pluralistic, multifaceted and ever-changing mosaic of library and commercial systems and networks that will be the national library and information network in reality, if not in name.

This largely uncoordinated, "disjointed", decentralized networking situation may be viewed with alarm by some leaders in the U.S., Canada, and Europe. On the positive side, the environment is rich with new, innovative uses of computer and communications technology, devised by knowledgeable, public service-oriented librarians to better facilitate resource sharing and provide needed information and materials to library users.

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PLANNING FOR INTERNATIONAL INTERLIBRARY LOANS

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Abstract

In the United States, international interlibrary loan is generally regarded as the route of last resort. We justify this view because of our belief that international ILL is expensive and unreliable. We discourage our patrons from requesting overseas on the grounds that it may take months to obtain a transatlantic loan. Conversely, we have been reluctant to become full participants in international resource sharing. Our objections to lending are the same as our objections to borrowing - cost and unreliability.

This paper, given from a US perspective, reports on the results of a survey of policies and procedures made of the ARL libraries (Association of Research Libraries) and proposes the theory that transatlantic interloans are not cost energy in an attempt to obtain materials within our borders rather than applying to an overseas library. While transatlantic interloans are, and will be, more complex than resource sharing within ones own border it is not necessarily the burden we would have it be.

PLANNING FOR INTERNATIONAL INTERLYBRARY LOANS

1. INTRODUCTION

In the United States international interlibrary loan is generally regarded as the route of last resort. We justify this view because of our belief that international interlibrary loans are expensive and unreliable. We discourage our patrons from requesting overseas on the grounds that it may take months to obtain a transatlantic loan. Conversely, we have been reluctant to become full participants in international resource sharing. Our objections to lending are the same as our objections to borrowing - cost and unreliability.

Over the last ten years I have been involved with interlibrary loans at three academic libraries, each with a very different attitude towards transatlantic interloans. The first did not loan or request overseas, believing that such transactions had a very low success rate and that its own collection was sufficiently international to fill most research needs. The second had the philosophy that it was the job of the interlibrary loan department to use whatever means were necessary to obtain whatever material was requested by its patrons. My third, and present position is with the University of Illinois, a relative new comer to international interloans. We have been requesting and loaning overseas for less than two years.

In each case, the decision to participate or not participate came from the library administration, not as a decision by the interlibrary loan department, and, in each case the policy was based on perceptions and service philosophy, not on use studies or cost analysis. How effective is transatlantic resource sharing? What are the barriers and does our experience justify our attitudes?

2. BARRIERS TO TRANSATLANTIC INTERLOANS

The barriers for any library attempting to obtain the oan of a book or a photocopy from beyond its borders fall into four basic categories: bibliographic access; physical access; payment; and, language.

Bibliographic Access

Bibliographic access can be seen as two separateproblems. The first barrier is quite simply learning that the material exists - subject acess to monographs,journal articles, government documents, patents, and dissertation. Each of these categories may require access through a different paper index, bibliography or data base. The cost of even one of these tools, e.g. Dissertation Abstracts International, may be prohibiltvely expensive to a library which considers foreign publications peripheral to its collection.

Once a patron identifies a known item, the library is then faced with the second bibliographic problem, that of identifying a library tat is likely to own it. The tools of locations, e.g. British Library Catalog, again are ofen prohibitively expensive. Further, these materials require a degree of sophistication wh foreign languages and cataloging conventions. On-line sources such as OCLC are ot universally available and do not offer key word or subject access.

Physical access

Beyond the question of bibliographic access is realphysical access to the item. Most countries do not have a central agency where foreign libraries can apply for interlibrary loans. Although IFLA promotes central national libraries, unless a country already offered such a service few are able/willing to provide se (1). As a result, international interlibrary loans may be a double blind request: unverified citations sent to a library which may or may not supply international interloan. Physical access can also be seen in terms of the length of time required to obtain an item which in turn may be complicated by customs requirements or political duties (2).

Cost

Even if they do not charge for loans, the majority of libraries charge for copies. While ost libraries expect to pay for this service, there are at least three factors that make payment between countries expensive or procedurally prohibitive: requirements for prepayment or a deposit account; the difficulty of obtaining foreign currency; and, the cost of the item itself with consideration of the exchange rate (3). All of these factors must be considered in context - the payment of a relatively small amount of money to a supplier who may not be used again for months, if ever.

Language

The final barrier is language. In order for an international interlibrary loan request to be successfully transacted the request and the reply to the request must be understood by the staffs of both the borrowing and the supplying library. Abbreviations and phrases which are normal conventions within one country may be totaly incomprehensible to another. Requests may be submitted on a number of different forms or as a letter which must be translated before it can be processed.

3. THE NEED FOR INTERNATIONAL COOPERATION

These barriers; physical and bibliographic access, cost and language are all real and valid concerns. However, the question is not one of "can it be done?" but rather, "does it need to be done?". Our practices and policies should be based on that answer, not on considerations of personal convience. As Richard Dougherty put it: "To question the cost effectiveness of a shared resource program may be asking the wrong question if the answers don't help move us toward our real goal of increasing access to specialized materials or simply to materials our users are requesting but we don't own"(4).

I believe the answer to the question is yes; we need international interlibrary loans. We need it for exactly the same reasons that we need intranational loans. Just as no library can be totally self-sufficient, no nation can meet all the information needs of its citizens. The easy reason is that acquisitions budgets are not large enough, but they will never be large enough. What we as librarians are expected to supply is nothing short of the sum total of all human knowledge - everything that is known and will be known. The world of information simply expands too quickly and in too many directions for any library to anticipate and provide everything our patrons need.

Even as demand diversifies, our budgets are requiring us to concentrate more and more on core collections. A library faced with serials cancelations does not target heavy use items, it targets peripheral materials which are available elsewhere. The inevitable result is that collections within each country will become more alike (5). A second, less obvious result, will be a scattering of unique titles as selection officers defer purchasing materials that can be obtained through resource sharing in order to purchase unique titles (6). Every library in every nation has unique titles, larger libraries simply have more (7).

What I have tried to show is that under budget constraints collections within each nation will become more, not less alike. Second, that collection development will result in purchase decisions which tend toward core collections and items unlikely to be available elsewhere. And, third, that all libraries have unique titles. The conclusion is that all nations, just like all libraries, have a continuing reliance on each other's resources to meet the information needs of their citizens. We are all dependent on each other, indeed we always have been.

Are we then faced with the problem of providing a necessary but difficult service? No. The service is necessary, but it is not necessarily difficult. While the barriers are real, they may not be as high or wide as we have assumed. Quoting Michael Nortier, "...once the principle of loans is accepted, lending outside the country is no more difficult than limiting one's consignments to the national territory"(8). It is past time we reconsidered our reluctance to loan and request overseas and began to think in global terms.

4. THE US AND CANADIAN ACADEMIC EXPERIENCE

In preparation for this symposium I conducted a survey of practices and preceptions of international interlibrary loans amoung the members of the Association for Research Libraries. The ARL covers both United States and Candadian libraries, but for the purposes of this study I considered our two countries a single entity. We share a long border and an equally long tradition of resource sharing and, while I can not speak for the Canadian libraries, I do know that most US libraries do not consider a loan to Canada an international loan. I choose this group for two reasons. First, these are the libraries most likely to be involved with international interloans and, second, it can be assumed that these libraries have our standard bibliographic tools and at least some international union catalogs. Most have access to OCLC which covers an increasing number of European libraries. Of one hundred and eighteen surveys, I received 81 replies and found that, despite our expressed distrust of international interloans, we do it on a regular basis. All but one of the respondents particpated in transatlantic interloans at least to the extend that they would supply copies of material overseas.

Borrowing

Over ninety-five percent of the ARL libraries request materials from overseas. The overwhelming reason given is that they are not able to obtain the material from within our borders. That the largest research libraries in the United States and Canada are unable to fill their information needs from within our two countries speaks rather eloquently to the global interdepence of all libraries.

Accepting that we need international library cooperation is easier than the actual cooperation. We have realtively few tools to identify European libraries, or at least not enough. Three quarters of the libraries reported that they used tools such as the British Library Catalog, but we rely on advice from our patrons almost as much as we rely on bibliographic tools; over 70% reported that they will submit a request based on their patron's suggestions. In fact, more librarians use their patron's suggestions than consult an international library directory. Although European use of OCLC is relatively new, over 60% reported that they check OCLC for holdings.

If seventy percent of the ARL libraries are willing to submit a request because their patron thinks that a library might have it, clearly identifying appropirate libraries is a problem. This may account for the fact that US and Canadian libraries will exhaust not only our known locations, but every possible location before trying overseas. At first, exhausting local resources may seem a reasonable approach, however, utilities such as RLIN and OCLC are so dependable for post 1976 imprints that if an item can not be found in those data bases it is probably not available within our borders. We are so reluctant to try overseas that we are willing to poll libraries we are relatively certain do not own a title before we will try a library that probably does. This practice delays the receipt of the material, increases the cost of the transaction and frustrates both the librarian and the patron.

Once a librarian decides that if the material is to be obtained, it must be obtained from overseas, she does not restrict herself. Only a few reported that they would try only the country of imprint e.g. Italy for Italian imprints. Eighty percent were willing to try any reasonable source for a loan or copy. This may be a result of our experience with the British Library whose collection is one of the most truely international collections in exsistence. We in the US and Canada are used to going to British Library for journal articles and conference proceedings in all languages.

Countries and success rates - borrowing

As part of the survey I asked libraries to list the countries from whom they request from and the countries who request from them. The list is thirty six countries long, however, the majority of ARL borrowing transactions occurs between seven countries. We obtain most of our materials from: Australia; France; Italy; Japan; the Soviet Union; the United Kingdom; and West Germany. Amoung those seven, we request most eavily from France, West Germany and Great Britain. This can be explained by three factors, first, more of us can read English, French and German than any other languages; second, we are most familiar with those libraries and last, especially for third world materials, the country of publication is not always the most likely to own it (9).

The fill rates, or, at least the perceived fill rates for overseas requests vary a great deal, depending largely on the countries requested from. Libraries who limit their requests to the core group - France, West Germany and the United Kingdom - reported an average of 58% success for loans and 63.5% for copies. Libraries who regularly request from other countries have a slightly lower fill rate, 53% for loans and 58.7% for copies. However, most groups reported at least that they were able to fill at least fifty percent or more of their requests.

The lowest fill rate for loans was reported by libraries which request exclusively from the United Kingdom. This group also reported a high fill rate for copies. This apparent iscrepency is probably due to reliance on the British Library which is an excellent source for journal articles but is not really in the business of loaning overseas.

Lending

Bibliographic access is a problem for all libraries. The most common bibliographic problems reported by the ARL libraries were bad citations, inadequate abbreviations and requests for materials the library did not own. The biggest problems in processing requests came from requests submitted by indivduals, not libraries. Libraries reported that they frequently recieved post card requests for reprints or hand written letters where the hand writing, not the language, was difficult to understand. Many of the problems "volunteered" by the respondents did not seem to be problems at all, but rather an expression of frustration at not being able to fill more of the requests they received because the material could not be loaned or, that it could not be copied due to copyright restrictions. An interesting problem that I wish I had thought to include on my list was the problem of address. Several libraries reported that they are not able to identify the address of the requestor. The requestor, be it an individual or library might well have had their return address neatly printed on the envelope but overseas requests are often addressed simply to the library or even to the university. When the requests are forwarded to the interlibrary loan department the envelopes may have been thrown out or saved by stamp collectors!

Most of the libraries were willing to loan material overseas and had lending policies only slightly more restrictive than their requirements for US and Canadian loans. The most important considerations were not the age or value, but the physical condition of the book and the local demand. ARL libraries were generally unconcerned about the subject matter or where the book was being sent. If the book was in good condition and the circulation record did not show heavy use the libraries were willing to loan. The question of local demand is undoubtedly influenced by the reported expectation that a book sent on international loan would be gone between two and three months.

Copy service

While we will loan only to other libraries almost half of the respondents were willing to supply copies to libraries, corporations and individuals. The cost of the service, and the billing mechanism varied accordingly. All but a few of the ARL libraries charge for overseas copy service and in most cases the charge for copies is higher to compensate for higher cost of postage. Individuals are usually expected to prepay but seventy percent of the libraries were willing to bill libraries and corporations, most required payment in US or Candaian funds. Only one library reported that it required deposit accounts.

The survey's questions about problems with overseas copy orders inspired some libraries to list their grievances in excruciating detail, many of the interlibrary loan departments replied that collection and billing were handled by campus accounting and that they had no idea if a bill was paid or not. Of the libraries that could comment the most common complaint was that bills were not paid. There was a fair amount of rustration expressed regarding payments - libraries received checks without orders and orders without checks, they spend time and effort preparing estimates that do not result in orders and some orders had to be sent a second time because the copies were never received. Several libraries reported that they had stopped charging for overseas orders because it was easier and less expensive than billing.

Requestors and success rates - lending

We receive overseas requests from basically the same countries we request from. Most of our requests come from: Australia, France, Japan, South Africa, the Soviet Union, the United Kingdom, and West Germany. With the heaviest traffic, more than thirty libraries reporting regular requests, from Australia, South Africa, the Soviet Union, the United Kingdom and West Germany. Libraries who receive requests primarily from this core group reported that they were able to fill almost seventy percent of copy requests and sixty five percent of the loan requests.

5. CONCLUSIONS AND RECOMMENDATIONS

Resource sharing between European libraries and North American academic libraries is fairly successful, at least from an American perspective. Our differences lie not in philosophy but in practical applications.

The greatest barriers to resource sharing between the European community and the ARL libraries are bibliographic access and payment for photocopies. A number of excellent papers have all ready been written calling for a rationalization of international payment (10) and support the view that small amounts of copying should be supplied free of charge to international requestors. The sums involved as insignificant compared to the problems of estimates, billing, and collection.

OCLC and other forms of electronic communication wil have a significant impact on bibliographic access. In a working paper for the Libary of Congress Richard Boss states that five conditions must exist for successful interliary loans: verification;location; interlibrary loan agreements; transmission of requests; ind, rapid supply of documents (11). The fact that we are requesting from and supplyingto the same countries and, our reported success rates suggest that we have interlibrary loan agreements. As more libraries begin to use utilities such as OCLC and electronic communication devices such as facsimile transmission we will have increasing ease of verification, location and transmission of requests.

Our final challenge will be the rapid supply of documents. Unfortunately, many aspects of supply are beyond our ability to influence. As librarians we can agree to build networks but we can not build roads; we can change or price schedules but not train schedules. However, I believe that interlibrary loan librarians are as concerned with knowing if an item can be supplied as actually obtaining the item. In terms of international interloans a rapid response can save a ignificant amount of time and frustration and, unlike document delivery, response tie is entirely within ourcontrol. Here too we can make use of OCLC, electronic mail or facsimile transmission to speed replies. If we can respond quickly to international reques it will no longer be necessary to think of transatlantic interloans as a last resort, as Frderick Kilgour said, we will be able to think of every library as a library of first resort.

APPENDIX I

COUNTRIES REQUESTING FROM OR SUPPLYING MATERIALS TO ARL LIBRARIES

Number of Libraries Reporting

	Requests to	Requests from
Argentina		1
Austria	2	
Australia	18	42
Belgium	1	1
Brazil	1	1
Chilie		1
China	2	1
Columbia		1
Denmark		7
France	41	23
Guam		1
Egypt		1
Finland	1	3
General Scandanavia	1	3
General South/Central America	1	1
Hong Kong	1	3
Hungary	1	
Italy	13	
Japan	12	33
Mexico		3
Netherlands	3	6
New Zealand	1	7
Norway	1	3
Philippines	1	1
Poland	3	7
Saudi Arabia	1	1
Singapore		1
South Africa	1	30
Soviet Union	27	38
Spain	7	5
Sweden	1	2
Switzerland	1	2
Turkey		1
United Kingdom	41	40
West Germany	40	40

APPENDIX II

REPORTED SUCCESS RATES - BORROWING

Requesting only from the United Kingdom

loans = 47.5
copies = 72

Requesting only from the United Kingdom and Western Europe

loans = 58
copies = 63.5

Requesting primarily from heavy use countries (Australia, Japan, France, the Soviet Union, the United Kingdom, West Germany)

loans = 63
copies = 72

Requesting from all countries

loans = 53
copies = 58.7

REPORTED SUCCESS RATES - LENDING

Lending activities could not be broken down by the same categories as borrowing. Libraries are in control of the countries they request from, but not who requests from them. For this reason this list is arranged by: libraries who supply to fewer countries than the heavy use list; those who supply primarily the heavy use list; and, libraries who supply on a more global scale. The heavy use list for lending is: Australia; Japan; South Africa; the Soviet Union; the United Kingdom; and, West Germany.

Less than the heavy use list, covers primarily Australia; the UK; and, Western European countries

loans = 68.57
copies = 71.43

Success rate for the heavy use list

loans = 63.26
copies = 69.88

Global suppliers

loans = 55
copies = 65

APPENDIX III

Success rates by number of countries accessed

Number of countries	Fill rate Loans	Fill rate Copies	Number of libraries reporting
1	+ 67.5	+ 72	7
2	+ 58	+ 63.5	16
3	+ 68	+ 68	7
4	+ 63	+ 72	12
5	+ 52, 63	+ 86	26
6	+ 83	+ 58	8
7	+ 70	+ 55	7
8	+ 25	+ 80	5

Seventeen libraries did not report the countries they access

APPENDIX IV

Geographical use by number of countries accessed

Number of countries accessed	Geographical use	Number reporting
1	United Kingdom	6
	Western Europe	1
2	Australasia	1
	Far East	1
	Soviet Union	2
	Southern Europe	1
	United Kingdom	12
	Western Europe	11
3	Australasia	1
	Central Europe	1
	Scandinavia	1
	Soviet Union	1
	United Kingdom	7
	Western Europe	6
4	Australasia	4
	Far East	1
	South America	1
	Southern Europe	4
	Soviet Union	9
	United Kingdom	11
	Western Europe	10
5	Australasia	9
	Central Europe	1
	Far East	5
	Scandinavia	1
	South Africa	1
	South America	1
	Southern Europe	4
	Soviet Union	9
	United Kingdom	13
	Western Europe	13
6	Africa	1
	Australasia	2
	Far East	2
	Middle East	1
	Scandinavia	2
	South America	1
	Southern Europe	3
	Soviet Union	3
	United Kingdom	5
	Western Europe	6
7	Australasia	1
	Central Europe	1
	Far East	1
	South America	1

	Soviet Union	1
	United Kingdom	2
	Western Europe	2
8	Central Europe	1
	Far East	1
	Southern Europe	1
	Soviet Union	1
	United Kingdom	1
	Western Europe	1

APPENDIX V

Processing problems reported by ARL libraries

Problem	Number of libraries reporting
requests for reprints (post card forms)	56
do not own material	51
bad citations 36	
handwritten/letter	35
inadequate abbreviations	33
multiple requests on one form	30
do not understand the language	23
do not understand the form	14

processing problems volunteered
can't identify the address
can't bill without statement that library is willing to pay
requests for dissertations (that are available through University Microfilms)

APPENDIX VI

Factors considered before loaning overseas

	Libraries reporting
size and weight of book	30
local demand	26
type of library (e.g. public)	19
country requesting	18
subject of maerial	11
status of patron (e.g. student)	7

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TRANSDOC, EUROPEAN PROGRAMME FOR ELECTRONIC STORAGE AND DOCUMENT DELIVERY

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TRANSDOC, EUROPEAN PROGRAMME FOR ELECTRONIC STORAGE AND DOCUMENT DELIVERY

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Abstract

On the initiative of the French Council for Scientific Research (CNRS) several partners have joined together and formed a scientific group to develop this programme. Initially the partners were:

< CDST - Scientific and Technical Documentation Centre of CNRS
< INPI - National Institute of Industrial Property
< DER/EDF - the Study and Research Department of the French Electric Company
< DETN/GDF - the Department of New Studies and Techniques of French Gas Company
< FNPS - the National Federation of the Specialized Press
< TELESYSTEMES - company for Telecommunications and Informatics

In 1986 the Direction of Libraries, Museums and Scientific and Technical Information of the Ministry of Education (DBMIST) has also joined the programme. The project has been sponsored by the EEC and the French Interministerial Mission for Scientific and Technical. Information (MIDIST) and resulted in new projects/services within the different participating organization.

TRANSDOC is an experimental programme for the electronic archiving and distribution of documents. The project consisted in designing, developing and finalizing a system that would integrate all the functions of a general information system:

- the acquisition and storage of the entire text of the chosen store of documents using "facimile" image-processing techniques

- the coupled use of the archiving system with several internationally distributed data bases by means of a host that allows access to the document

- the electronic readout of documents previously stored on digital optical disks or microfiches by means of a high-definition screen or a laser printer.

TRANSDOC, EUROPEAN PROGRAMME FOR ELECTRONIC STORAGE AND DOCUMENT DELIVERY

1. THE LATEST OF TRANSDOC

GENERAL DESCRIPTION

The programme consisted in designing, developing and finalizing a system that would integrate all the functions of a general information system:

* the acquisition and storage of the entire text of the chosen store of documents in accordance with "facsimile" image-processing techniques. In the case of TRANSDOC the technique consisted in using a scanner to transform the document, which is either in microfiche form or on the original paper, into a black-and-white numerical image with a definition of 8 x 8 points per millimeter in accordance with the CCITT Group III standard.

* the coupled use of the archiving system with several internationally distributed data bases by means of a host (Telesystemes-Questel) that allows access to the document.

* the electronic readout of documents previously stored on digital optical disks or on microfiches by means of a high-definition screen or a laser printer, locally, in an initial stage.

TRANSDOC has tested two types of technical equipment for the electronic storage of documents:

* digital optical disk equipment (DOD), developed by the French MC2 Company and made up of American equipment from the Integrated Automation Company and French equipment especially the digital optical disk from Alcatel Thomson Gigadisc (ATG). In this line of equipment, the digitized images obtained after transformation, of the paper document by numerization are stored on DOD in a compressed digital form.

* microfiche equipment developed by "Companie Général d'Automatisme" (CGA), including a cabinet that can contain up to 5.000 A6-standard microfiches, with automated access and digitizing of the microfiched document on request.

In both cases, link and access to the document is handled by a Mini 6/Bull computer, which performs the link between the logical reference (documentary reference) and the physical reference (storage address) of the document.

This management computer receives the documentary references in the following two possible ways:

- Through the intermediary of a local or remote (Questar Bull) interactive acquisition station,

- at a distance, by means of a database host which contains, among other things, the bibliographical references of the documents.

Moreover, the system keeps a trace of all transactions for purposes of accounting (follow-up and customer billing), statistics, and processing connected with copyright.

2. TRANSDOC ELECTRONIC DOCUMENT DELIVERY

TRANSDOC is an experimental programme for the electronic archiving and distribution of documents which has been developed by a group of 6 French organizations, from 1983 to 1985.

It is one of the 10 projects on the DOCDEL general programme (document delivery) of the EEC (European Economic Community).

The TRANSDOC programme made it possible:

* to test the various techniques that have recently been invented and that make it

possible to implement electronic documentation, digitalization of images, archiving on digital optical disks, etc....,

* to determine the impact of these technologies on the entire data processing chain from the creation of databases to the readout of the entire text, including its storage.

On the initiative of the French Council for Scientific Research (Centre National de la Recherche Scientifique, or CNRS), several partners have joined together and formed a scientific group to develop this programme:

- * the Scientific and Technical Documentation Centre (Centre de Documentation Scientifique et Technique, or CDST), a part of the CNRS,

- * the National Institute of Industrial Property (Institut National de la Propriété Industrielle, or INPI),

- * the Study and Research Department of the French Electric Company (la Direction des Etudes et Recherches d'Electricité de France, or DER/EDF),

- * the Department of New Studies and Techniques of the French Gas Company (la Direction des Etudes et Techniques Nouvelles du Gaz de Franc, or DETN/GDF),

- * the National Federation of the Specialized Press (la Fédération Nationale de la Presse Spécialisée, or FNPS),

- * the Telesystemes Company.

As part of the extensions scheduled for 1986, the Head of Libraries, Museums, and Scientific and Technical Information (Direction des Bibliothèques, des Musées, et de l'Information Scientifique et Technique, or DBMIST) of the Education Ministry will join the TRANSDOC group.

Several factors have favoured cooperation on such a test, especially the high cost of needed investments.

Moreover, this programme has benefited of financial support from the EEC and French public authorities, i.e., the Interministerial Mission for Scientific and Technical Information (Mission Interministérielle del Information Scientifique et Technique, or MIDIST).

Though it has integrated all the functions for the specific needs of the test, this architecture makes use of the modularity and the complementarity of the systems. In particular, TRANSDOC becomes a complementary system for bibliographical database hosts and remains a system open upstream that can be connected to other host systems (this was done during testing for the EURODOCDEL project) and also open downstream for remote delivery of stored information.

In all cases, a basic principle of modularity has led to the specialization of two interconnected processors, one of which handles management functions (Mini 6/Bull) and the other of which handles image-processing functions (ILC or image link controller).

THE TEST

The test was based on:

* A scientific and technical store of documents:

  - A selection of scientific periodicals in the biomedical field for which the FNPS (a partner of TRANSDOC) obtained a specific authorization from the publishers concerned,

  - French patents published in 1985,

  - Internal technical reports from Electricité de France and Gaz de France;

* Databases produced by the partners, Centre de Documentation Scientifique et Technique du CNRS (Centre Nationale de la Recherche Scientifique), Institut National de

la Propriété Industrieelle, Electricité de France, and Gaz de France, and widely distributed:

- PASCAL for the field of scientific periodicals,
- INPI 1 for patents,
- EDF-DOC and DAUGAZ for technical reports;

* The international host Telesystemes-Questel;

* A group of publishers, the FNPS, for the study and observance of copyright, a very sensitive field, one in which legal texts should be overhauled;

* European users, such as researchers or research laboratories, industrialists, academics (the Faculty of Medicine of the Catholic University of Louvain, the Faculty of Lausanne), etc....;

By traditional means of access to hosts and bibliographical research through databases, users confirm their choice and, in transparent and automatic fashion, obtain access to the entire text stored in TRANSDOC.

In an initial stage, the text is sent to them by mail after being printed by laser printer locally; later, this will be done remotely by telecopy or transmission by satellite, which will be extended in 1986.

The test has made it possible:

* to acquire know-how in the field of archiving and in the electronic document delivery. This has already enabled, or will soon enable, each participating organization to decide to use, and to promote, these technologies in its specific fields in order to modernize its services or create new services.

TRANSDOC has made a significant contribution - though this was neither the initial purpose nor the main motivation of the partners - to the improvement or stabilization of industrial products, some of which are now being marketed.

* to inform the public and enhance its awareness to a considerable degree through publications, reports, conferences, colloquia, and visits (over 1,000 visitors came to TRANSDOC in one year) with regard to the possibilities opened up by these types of technology;

* to understand the legal problems involved in copyright; solutions will soon be proposed that will no doubt lead to more appropriate legislation;

* to design production lines and estimate costs and thus, also, the cost price of a stored page or delivered page;

* to evaluate, with the help of experts appointed by the EEC, all tests on the technical, economic, and user-service levels. The results of these studies will be recorded in reports submitted to the EEC in 1986 by groups of experts. In a general way, they deal with the time and quality of processing, associated costs, and the level of satisfaction of users.

3. FUTURE DEVELOPMENTS

The expert knowledge of archiving and the know-how acquired during the TRANSDOC programme will enable each of the partners in 1986 to develop, on the basis of TRANSDOC, models of future services alongside studies and developments now underway in the field of electronic archiving.

For INPI, the creation of a center of documentary study and research to take over the stock of French patents in digitized form (7,000,000 pages) by 1986.

For EDF, the creation of a center for archiving on DOD the internal memos of the study and research division.

For Telesystemes, a plan to create a scanning center for the archiving of documents from outside clients and a plan to store them on CD-ROM.

For the CNRS, integration of new technologies within the framework of creation of the new center for the intensive document delivery in Lorraine.

The objective will thus be to test services based on an archiving system involving:

- technologies already tested in 1983-1985,
- new telecommunication technologies allowing delivery at a distance,
- more appropriate organizations for these services, with a view, in particular, to reducing the time periods required to make the information available.

The proposed extensions will consist in delivering documents electronically to customers either by Group III telecopy on a public packet-switching network or by a high-flow transmission network, by using the services of TELECOM 1 TRANSDYN or TRANSCOM with 64K bits/second.

Transmission by Group III telecopy

This will be developed on two lines of equipment and will enabla a user equipped with a Group III telecopier to receive a document that he considers urgent within very short notice (between 1/2 hour and 1/2 day at the most).

Three types of services are proposed:

- A service providing access to scientific articles on digital optical disks in connection with the CNRS' PASCAL database,
- A service providing access to EDF and GDF technical notes on digital optical disks in connection with the EDF-DOC and DAUGAZ bases,
- A service providing access to INPI and computer representational trademarks placed on microfiches and stored in the microfiche equipment in connection with INPI's "Trademarks" database.

In view of the low rates of flow that are possible in telecopy on a packet-switching network, the large amount of information to be sent on it, the number of installed telephone lines (2 lines in an initial stage, which could be increased to 4 later on), and the substantial cost of teletransmission, to be paid by the user, the service will be limited to about 600 pages per day, i.e., and average of 80 scientific articles; on the other hand, the representational mark service, estimated commercially at 100 pages per day, will be unlimited. In both cases, transmission by telecopy is done automatically by the system and makes it possible to provide continuous day-and-night service.

Despite the technical limitations linked to the low rates of transmission flow and the higher costs with respect to the traditional service, it has become clear that this type of service is of interest to certain users who have an urgent need for the document.

High-flow transmission (by satellite)

The problems mentioned above are solved to a large extent by transmission at 64K bits/second. However, in view of the subscription fees and the utilization costs of the TRANSDYN and TRANSCOM services and the costs of acquiring transmitting or receiving communication computers, this solution cannot be selected or justified except the sending of large or numerous documents.

The situation has led us to propose an inter-library "electronic supply" service.

On the basis of TRANSDOC serving as an archiving center to which will be connected a transmit data station controller linked to TELECOM 1 services and a French university library (another documentation center in Europe is under study) equipped with a receive data station controller, also linked to TELECOM 1, it will be possible to transmit scientific documents stored on digital optical disks for which a request has been made directly either by the library or via the PASCAL database.

For this experimental service, the subscription fees for TELECOM 1 services are paid by the TRANSDOC group, and the cost of querying the PASCAL database, of supplying the document transmitted, and of utilizing the system is paid by the library.

4. IN CONCLUSION

The TRANSDOC test has yielded positive results. It has made it possible to confirm the following:

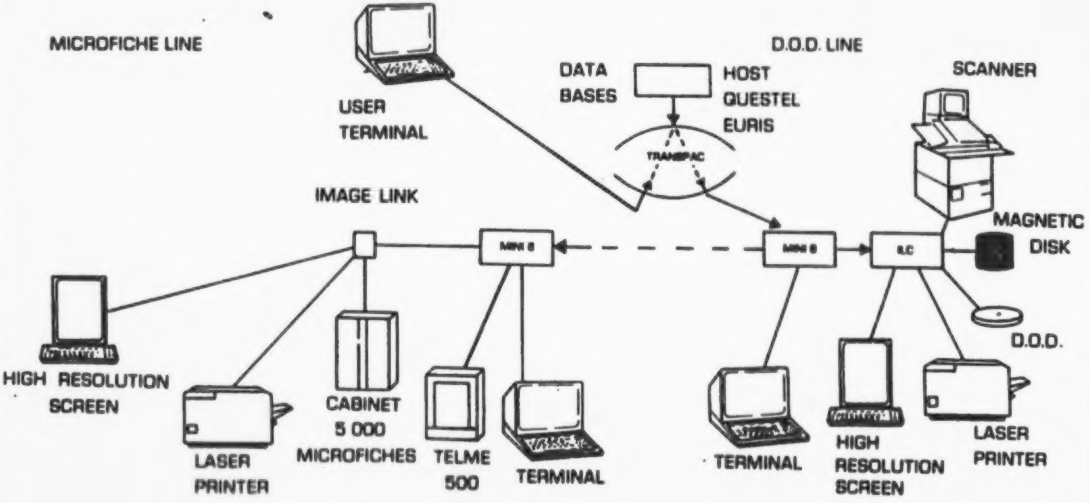
- It is technically possible to perform archiving electronically and the organizations needed to implement these new technologies do work;

- there is a good match between the services tested and the needs of users, and new services can be created, current ones, improved.

Beyond purely technical tests, the significance of such testing oriented towards routine use and the evaluation of the needs of future customers is by now completely obvious.

TRANSDOC has made it possible to confirm that the arrival of these new technologies will considerably modify the information market in all its forms very quickly.

GENERAL ARCHITECTURE OF THE SYSTEM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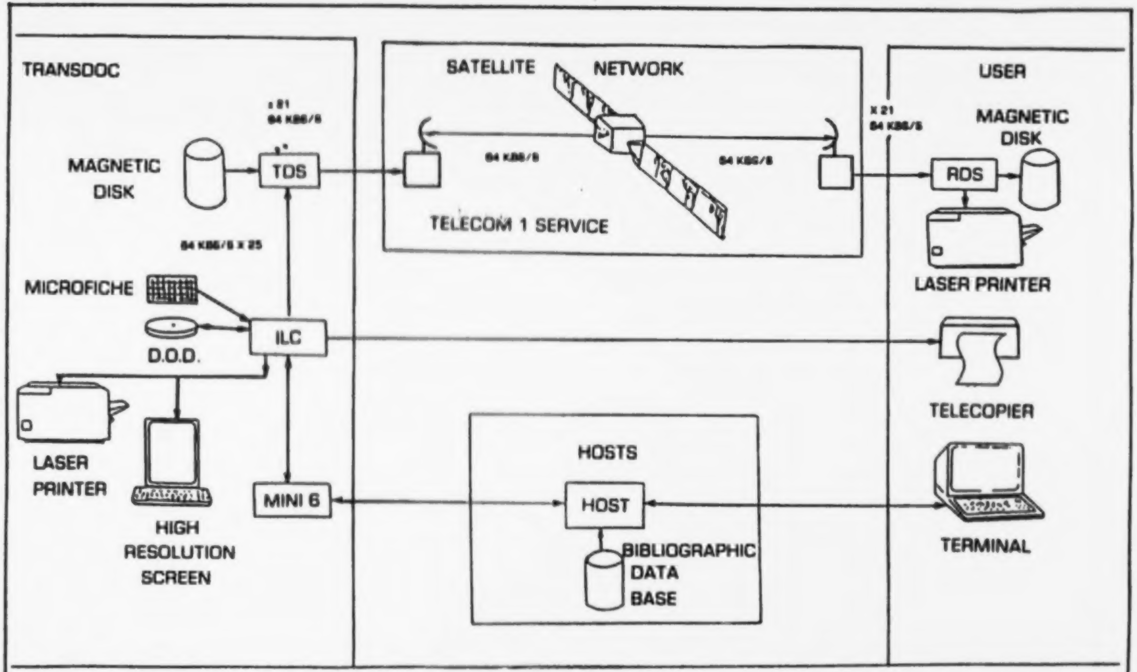
USER TERMINAL
D.O.D. LINE
DATA BASES
HOST QUESTEL EURIS
TRANSPAC
SCANNER
IMAGE LINK
MINI 6
MINI 6
MAGNETIC DISK
D.O.D.
HIGH RESOLUTION SCREEN
LASER PRINTER
CABINET 5 000 MICROFICHES
TELME 500
TERMINAL
TERMINAL
HIGH RESOLUTION SCREEN
LASER PRINTER


TRANSDOC
x 21
64 KBS/S
MAGNETIC DISK
TDS
64 KBS/S x 25
MICROFICHE
D.O.D.
ILC
LASER PRINTER
HIGH RESOLUTION SCREEN
MINI 6
SATELLITE
NETWORK
64 KBS/S
64 KBS/S
TELECOM 1 SERVICE
HOSTS
HOST
BIBLIOGRAPHIC DATA BASE
USER
X 21
64 KBS/S
MAGNETIC DISK
RDS
LASER PRINTER
TELECOPIER
TERMINAL

TDS = Transmit data station

RDS = Receive data station

GENERAL ARCHITECTURE OF THE EXTENSIONS

Fig. 3*c* presents an image with lens-to-quartz spacing decreased from the focus ($Z = -1.6$ μm). The reflection from the quartz has been minimized by adjusting the focal setting to a minimum of the $V(Z)$ (Fig. 2). The image has increased contrast for the cell margin. Bright linear features, which may be intracellular fibers, appear in some regions where they are only faintly detected in the $Z = 0$ image (Fig. 3*c*, arrows).

Polystyrene. Polystyrene has an impedance that is close to that of water. At a water/polystyrene interface, the power reflection coefficient is 6% for normally incident plane waves. The measured $|V(Z)|^2$ for the bottom of a polystyrene culture dish is shown in Fig. 4. The peak of the $|V(Z)|^2$ for polystyrene is reduced by a factor of 14 from the peak of the quartz $|V(Z)|^2$. On a polystyrene substratum, the reflection from the cell becomes a larger fraction of the total received acoustic signal.

The images of Fig. 5 show cells on a polystyrene substratum at two different focal positions. The reduced substratum reflection produces an enhanced ring contrast in the positive focal position image (Fig. 5*a*). At $Z = 0$, a complicated intracellular structure is observed whose linear features may represent cytoskeletal fibers and sites of attachment of the cell to the substratum. The nature of these images is reminiscent of those seen by interference-reflection microscopy (e.g., see ref. 8).

Quarterwave Glass-on-Sapphire. Finally, we designed a substratum with an antireflection coating of glass one-quarter wavelength in thickness deposited on top of a sapphire crystal. The glass layer serves to couple sound from the water into the sapphire. Fig. 6 shows the experimentally measured $|V(Z)|^2$ for a quarterwave glass-on-sapphire substratum. Notice that the peaks of the $|V(Z)|^2$ curve increase away from the focus unlike quartz or polystyrene. The $Z = 0$ peak of reflected power for a quarterwave glass-on-sapphire substratum is a factor of 2.4 less than for a quartz substratum. At $Z = -1.1$ μm from focus, the glass-on-sapphire has a deep minimum in reflected power that is a factor of 55 smaller than at focus.

Images of cells on a quarterwave glass-on-sapphire substratum at the $Z = -1.1$ μm focal position are shown in Fig. 7. These cells were imaged for 2 hr without apparent damage and exhibited normal patterns of motility. Both advance of the cell margin in the form of leading lamellae and retraction of extended processes were observed (9). The nucleolus of each cell is visible as a darkened region inside the nucleus. The dark margin seen at the bottom extension of the cell in Fig. 7*d* is believed to be the result of ruffling (10). The ruffle acts to scatter the acoustic beam creating a dark region in the image. Small particles, which may be lysosomes or lipid granules (11), are also seen within the cells. Both bright and dark particles are observed at the $Z = -1.1$ μm focal position. The observed dif-

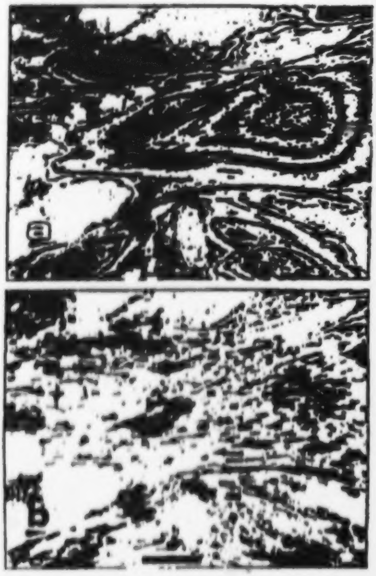


FIG. 5. Acoustic images of a cluster of cells on a polystyrene substratum. (*a*) Because of the reduced impedance of polystyrene, an enhanced ring structure is observed for increased lens-to-substratum spacing ($Z = 1.8$ μm). (*b*) At a different focus, $Z = 0$, a structure is observed that may correspond to intracellular fibers and sites of cell–substratum adhesion. Bar = 20 μm.

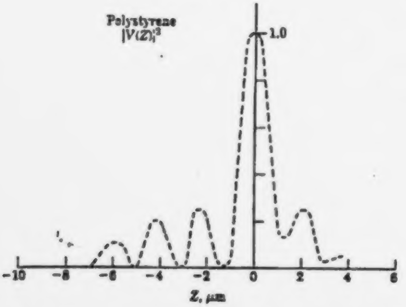


FIG. 4. The measured power output $|V(Z)|^2$ of the acoustic microscope as a function of focal position for a polystyrene substratum.

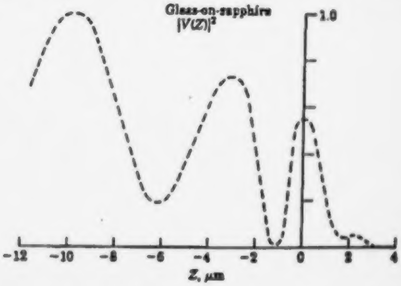
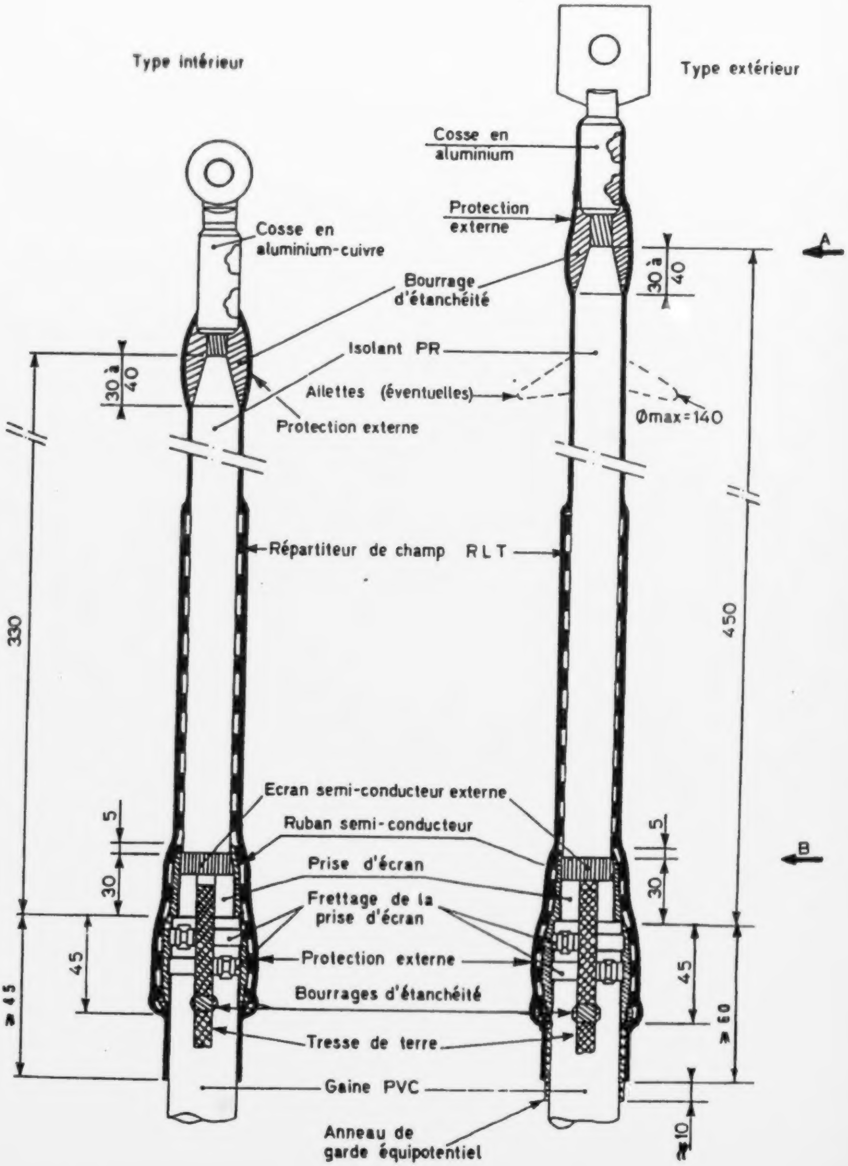


FIG. 6. The measured power output $|V(Z)|^2$ of the acoustic microscope as a function of focal position for a quarterwave glass-on-sapphire substratum.

Example: TRANSDOC Group IV printed on PC

EXTREMITES UNIPOLAIRES


Type intérieur
Type extérieur
Cosse en aluminium
Cosse en aluminium-cuivre
Protection externe
Bourrage d'étanchéité
Isolant PR
Ailettes (éventuelles)
Protection externe
Ømax=140
30 à 40
30 à 40
A
Répartiteur de champ RLT
330
450
Ecran semi-conducteur externe
Ruban semi-conducteur
Prise d'écran
Frettage de la prise d'écran
Protection externe
Bourrages d'étanchéité
Tresse de terre
Gaine PVC
Anneau de garde équipotentiel
B
5
30
45
≥45
5
30
45
≥60
≥10

cotes en mm

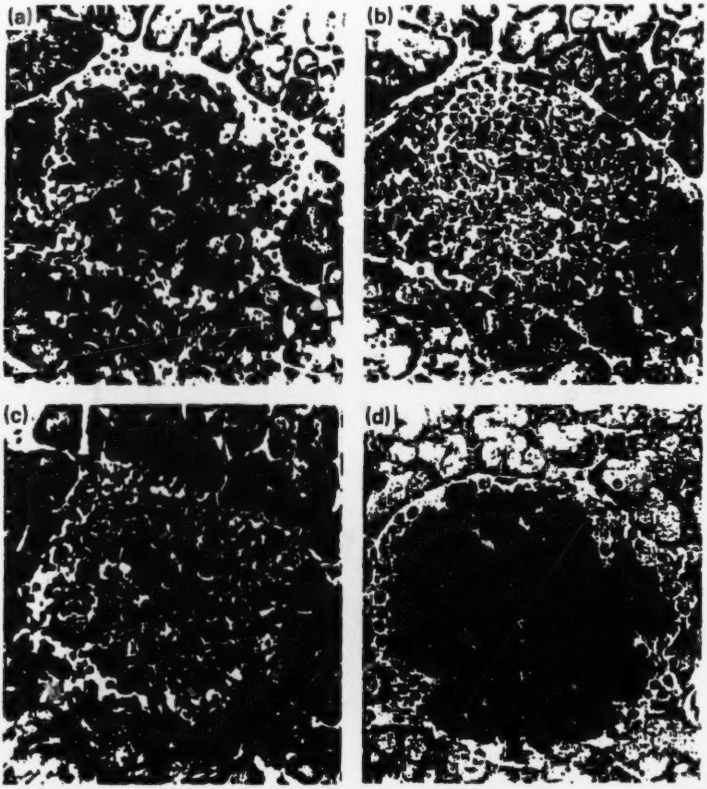


Figure 4 Immunohistochemical staining of specific islet cell hormones in adjacent sections of the islet of the insulinoma-bearing rat shown in Figure 3. (a) Weakly stained insulin-containing B cells are the predominant islet cell type. (b) Peripherally located glucagon-staining A cells exhibit degenerative change. (c) Somatostatin-staining D cells are scattered or clumped at the islet periphery. (d) Islets and B cells in the normal rat pancreas are larger than those of insulinoma-bearing rats (note different internuclear distance in (a)) and stain more intensely for insulin. (× 290.)

Two days after tumour resection, basal plasma glucose and insulin concentrations were similar to control rats and remained so until day 12 when basal insulin values were slightly raised (Figure 1). At this time glucose tolerance was improved compared with control rats and insulin concentrations remained slightly higher during the test (Figure 6a). The accelerated rate of glucose clearance, with the loss of an insulin response to glucose may provide early evidence of tumour recurrence. Moreover, the insulin response to arginine was impaired 12 days after tumour resection (Figure 6b). A single large tumour was eventually observed at the original subscapular site in each of the resected rats. Resection gave a 17 56 day (32 ± 4 day, $n = 12$) prolongation of life (55 ± 4 days since original tumour transplant) compared with the survival of similarly transplanted unresected insulinoma-bearing rats (24 ± 1 days, $n = 9$).

oxygenated arterial blood) water absorption had increased to (mean ± SD) 7.8 ± 3.6 μl/min/cm ($p < 0.02$ *versus* hypoxia), and the mean absorption rates of sodium, glucose, and glycine had risen significantly ($p < 0.01$ *versus* hypoxia). The transport of fructose and of lysine was unaffected by hypoxia, and their mean transport rates did not change significantly over the three experimental periods.

Jejunal mucosal enzymes. Hypoxia did not affect the specific activity of the studied brush border enzymes lactase, maltase, and sucrase; their respective values were similar during the three experimental periods. In contrast, the activity of the jejunal mucosal Na^+,K^+-ATPase was significantly depressed ($p < 0.001$ *versus* control) during the 2nd h of hypoxia; total ATPases remained unchanged and Mg^{++}-ATPase was increased, but not significantly. At the 4th h of the recovery period the activity of Na^+,K^+-ATPase rose significantly (p 0.05 *versus* hypoxia), although it did not reach control values, and Mg^{++}-ATPase decreased to nearly control values (Fig. 3*a*).

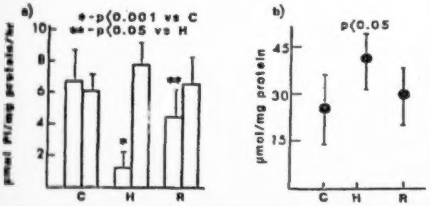


Fig. 3. *a*, mucosal ATPase activity (mean ± SD) during the control (*C*), hypoxia (*H*), and recovery (*R*) periods. Na^+,K^+-ATPase activity (☐) is significantly inhibited during hypoxia and rises during recovery. Mg^{2+}-ATPase activity (☐) is increased during hypoxia. *b*, mucosal ATP content (mean ± SD) during the control (*C*), hypoxia (*H*), and recovery (*R*) periods. ATP levels become significantly increased ($p < 0.05$) by hypoxia and return to near control levels during recovery.

Mucosal ATP content. This increased significantly ($p < 0.05$ *versus* control) at the hypoxia period and decreased during the recovery period, mirroring the changes observed in the activity of Na^+,K^+-ATPase (Fig. 3*b*).

Mucosal histology and ultrastructure. The experimental procedure and the hypoxia induced by the venoarterial shunt did not cause any changes in the histology of the jejunal mucosa. The appearance of the epithelial layer, the villus/crypt proportions, the subepithelial structures, and the capillaries during the hypoxia and recovery periods were indistinguishable from those of the control period.

Electron microscopy demonstrated no alterations in capillaries and perivascular spaces, enterocyte arrangement, microvillar brush border, and intracellular organisation, at all three stages of the study. However, the period of hypoxia was associated with a distinct swelling of the enterocyte mitochondria (Fig. 4*b*), with a widening of the cristae and a decrease in matrix density. At the 4th h of recovery mitochondrial swelling was found to have completely subsided (Fig. 4*c*).

DISCUSSION

Hypoxia of the small gut has been reported to result in severe mucosal damage. There is denudation of villus epithelium, reduction in villus height and epithelial necrosis (1–3), with edema and hemorrhagic infiltration of the lamina propria and marked vascular congestion (2). Microcirculation studies have demonstrated a complete arrest of the microperfusion of the villus core (2) and a significant increase in permeability of intestinal capillaries (3). A severe impairment of the transport capacity of the small intestinal mucosa has also been noted (2, 4, 5), although mucosal ATPase were not affected (2).

The above mentioned observations have been derived from studies where hypoxia was induced by causing hypotension (3–5) or by different degrees of vascular occlusion (1–3), thus drastically reducing blood supply to the small intestine. In other works, hypoxia was provoked by submersion (6) or asphyxiation (7) of the experimental animal, and was also accompanied by a significant drop in intestinal regional blood flow. Because of the predominant element of ischemia involved, these investigational models may not be representative of the small intestinal effects

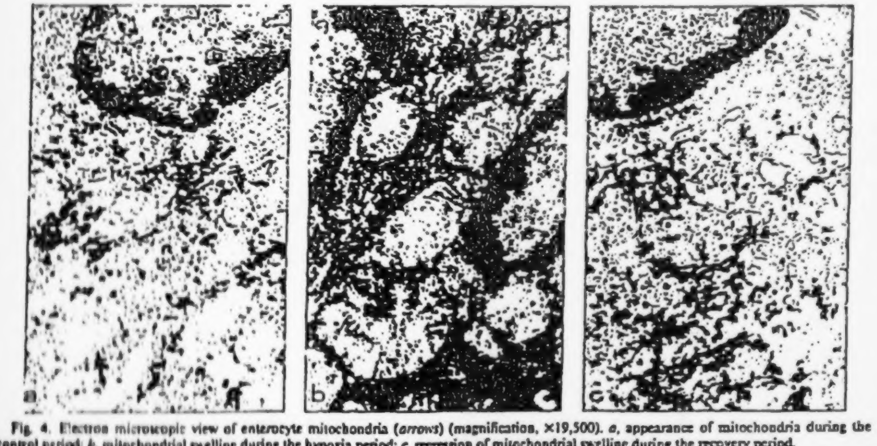


Fig. 4. Electron microscopic view of enterocyte mitochondria (*arrows*) (magnification, ×19,500). *a*, appearance of mitochondria during the control period; *b*, mitochondrial swelling during the hypoxia period; *c*, regression of mitochondrial swelling during the recovery period.

TECHNOLOGICAL DEVELOPMENTS RELEVANT TO LIBRARY COOPERATION

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Abstract

Three technological developments are widely recognized as important for cooperation between libraries: The use of records in machine-readable form, the manipulation of data by computers, and telecommunications. Along with the acceptance of standards and protocols, these developments enable remote access to databases such as OCLC and the duplication of databases (e.g. on CD-ROM).

Three other technological developments have potential for important long term effects: (i) Text and data in machine-readable form reduce the traditional centrality of local collections; (ii) A probable redefinition of the catalog; and (iii) The "Linked Systems Protocol" for linking computerized bibliographical databases. These changes will be significant for library cooperation.

TECHNOLOGICAL DEVELOPMENTS RELEVANT TO LIBRARY COOPERATION

Purpose

The theme of this symposium is library cooperation. The emphasis is on new technology. This paper will discuss, in general terms, some long term aspects of new technology and their significance for library cooperation.

Technology

Technology is a tool, an instrument for doing things. Each technology has its own characteristic capabilities and limitations. A change of technology brings new and different capabilities, new and different limitations.

Technology is very significant for libraries. The purpose of a library, in the words of Frederick Kilgour, "is to participate in the evolution of those profoundly human creations: beauty, faith, justice, and knowledge". But libraries do so indirectly. Directly they deal with texts, text-bearing objects, books, periodicals, etc. Libraries contain millions of physical objects on kilometres of shelves. Therefore, a change in the technology of text-bearing objects can be of fundamental significance for libraries.

Most importantly, the capabilities and limitations of the technology of computers are different, very different from the capabilities and limitations of paper and of cardboard.

Currently we use, or think of using, computers in libraries, but our concept of libraries and of library techniques is still defined by the characteristics of the technology of paper. Therefore, for effective planning, it is important to analyze the technology of paper as well as the technology of computers.

Computer technology includes:

- digital storage of text, images, data, sounds;
- manipulation of data;
- Telecommunications for remote access; and
- Standards for collaboration.

These capabilities make new forms of library cooperation possible, e.g. remote access to the OCLC database and the duplication and distribution of data on CD-ROM. There are practical, technical, and political difficulties and costs. However, in this discussion of long term possibilities, I shall assume good progress in library automation and will consider three developments concerning:

- Library collections;
- Library catalogues; and
- Linked systems.

Library Collections

The dominant characteristics of the technology of paper are that it is a localized medium and that it is an isolated medium. It is a localized medium because the reader and the book must be in the same place. If they are not, then:

1. The reader must go to the paper, which is often not convenient; or
2. The paper must be moved to the reader (e.g. on interlibrary loan), which is often not convenient; or
3. Another copy of the paper must be made, which is also often inconvenient or costly.

Paper is an individualistic, isolated medium because only one person can use it at a time, like a telescope. This is also a source of inconvenience and of problems of availability [1]. Professor Fabian has written eloquently of these inconveniences in his Buch, Bibliothek, und geisteswissenschaftliche Forschung [2].

The purpose of libraries is to provide convenient access to materials. With materials on paper, local collections are a necessary (but not a sufficient) condition for convenient access. Microfilm is a bad kind of paper: It is as isolated and even more localized, since equipment must also be present for it to be read.

In contrast, the technology of computers - of access to machine-readable data - is not localized, nor isolated. Material at a distance can be conveniently accessible. Two or more people can use a database at the same time.

The purpose of libraries is to make material conveniently accessible. With databases, local storage is not necessary. On some conditions it may be cost-effective, but it is not essential. We shall have no choice but to provide access to databases, not only to bibliographical records, but also to texts, numerical data, images, and sounds. Not to do so would be like a fifteenth century library failing to include printed books because they were different from traditional manuscript volumes.

As scholars begin to use machine-readable databases, the central, dominating role of local collections will begin to diminish to the extent that remote access becomes acceptable.

Cooperative collection development and interlibrary loan - library cooperation in sharing resources on paper - have serious unavoidable disadvantages. Cooperative acquisition of databases and mutual reciprocal access - library cooperation in sharing resources in machine-readable form - will bring problems and costs, but it is reasonable to expect the problems and the costs to diminish. Assuming good telecommunications and standards, this is a change of fundamental importance in access to materials locally, regionally, nationally, and even internationally [3].

A New Definition of the Catalogue.

The new developments in online catalogues are very exciting. However, I suggest that the library catalogue is becoming obsolete or, at least, needs significant redefinition.

The catalogue, by its nature, is a special kind of bibliography defined in two ways:

1. It is local in scope. It represents one collection or one library. Exceptionally, as a union catalogue, it can represent two or more libraries.

2. It gives severely limited bibliographical access. For periodicals it provides the title of the periodical but not the titles of the individual articles within the periodical.

These two limitations are not typical of bibliographies, but they are normal for catalogues.

In the USA the modern library catalogue was defined in the nineteenth century by Cutter, Dewey, and others:

- Standardized cataloguing rules for description and choice of headings;
- Standardized lists of subject headings with a syndetic structure of cross-references;
- Author, title, and subject headings interfiled into a dictionary catalogue;
- Classified relative location for shelving;
- Cards, 75 x 125 mm, instead of book catalogues.

One hundred years ago library directors were enthusiastic for the new catalogues, just as now they are enthusiastic for computers in libraries. But then there were protests from users and some librarians, who said that these complex new catalogues cost too much. It would be better, they said, to spend the money on bibliographies [4]. Catalogues are limited to local holdings, they said, but bibliographies are not so limited. Catalogues provide limited bibliographical access, they said, whereas bibliographies can provide detailed access. Catalogues are made by generalists, they said, and bibliographies are compiled by expert specialists. Bibliographies, it was asserted, are better for the user in almost every way. Nevertheless the library directors invested in the techniques and technology of the new catalogues, a move that has had great historical significance in two ways:

1. In an important sense, the making of bibliographies was moved outside of libraries. Now libraries have an increasingly serious problem in having to buy access to bibliographies from outside of libraries, from the information industry, from DIALOG, from BRS, and from others.

2. Catalogues are interesting from the perspective of the history of technology in libraries. Specifically, a catalogue record has two elements:

(i) A *bibliographical* element relevant to all copies of an edition (MARC fields through 899); and

(ii) A *local* element (MARC fields 900 and above) pertinent to individual local copies and local library records.

The first element is part of the universe of bibliography; the second is a matter of the details of local library holdings. The first element is best done by cooperation; the second cannot be done cooperatively. The catalogue is, therefore, a mixture.

The problem in the nineteenth century was that it is a limitation of the technology of paper that, with paper, it is not very practical to merge and unmerge files dynamically, to change format, or to link data in one file with data in another file. One *can* do these things in principle, but it is not very practical. Libraries had access to bibliographies on paper and libraries had local records, but they were difficult to combine, to merge, to reformat, to link. The solution of the technology of paper was, in effect, to develop a separate, *third* file - the catalogue. The bibliographical element was copied or created and elements of local data were added. I suggest that the modern library catalogue can be seen as a result of the constraints of the technology of paper.

In contrast, the technology of computers is very good at merging files, at reformatting, at maintaining links. There is no longer a technological justification for continuing the traditional definition of the library catalogue or the traditional isolation of the catalogue from the rest of bibliography. As an illustration of this point I would cite the "MEDLINE-on-MELVYL" project at the University of California. The nine campuses of the University of California include five medical schools. There is a widely accessible online union catalogue, known as MELVYL. The last three years of the MEDLINE database have been added into the online catalogue. It is intended to link the bibliographical records in the MEDLINE data with the holdings records. At that point library users will have the choice of searching at the conventional, limited level of a library catalogue or at the more detailed level of a specialized bibliography. Either way, they will be able to ascertain the local holdings of items of interest. Such a combination offers both a detailed bibliographical search capability and local holdings information, and is, therefore, more helpful to the user than either a traditional catalogue or a search on a commercial database service.

Further, the catalogue is, by definition, a list of what is what is held locally. But, as we noted in our discussion of collections, what is locally held is decreasingly relevant compared with what is locally accessible, local or remote. What is accessible and what is locally stored will become increasingly different. It would be illogical and a disservice to users to insist of restricting bibliographical access only to what is locally stored.

The modern library catalogue online is a wonderful development, but better is possible if we redefine the catalogue and reduce the separation of the catalogue from other bibliography [5].

The Linking of Bibliographic Systems

The draft US standard Z39:50 is entitled "Information Retrieval Definition and Protocol Specification for Library Applications". It is sometimes referred to as the "Linked Systems Protocol", but that name can cause confusion with the "Linked Systems Project", from which it derived. The draft standard is an application layer (seventh layer) protocol defined in terms of the ISO Open Systems Interconnection Reference Model.

The MARC format is for computer-to-computer communication of bibliographic records. The "Linked Systems Protocol" is for computer-to-computer searching of bibliographic databases in a standard form. For example, if you do not find what you want in a search of your local online catalogue, you could try to search other online catalogues, but that is difficult. They are all different and it is unrealistic to expect the adoption of a common command language. With a "linked systems protocol", one would ask one's local online system to search other systems for one. In effect, the protocol would extend your local system to include access other systems. You only need to understand your local system. This has three interesting consequences [6]:

(i) It provides a new, pragmatic and flexible definition for a national database: All databases linked by telecommunications and using a linked systems protocol;

(ii) Since searching a library catalogue is a form of bibliographical search, it would be logical to expand the protocol to permit linking to and searching of all kinds of bibliographical database, not only catalogues. Again this would reduce the separation of the catalogue from bibliography. There is currently enthusiasm for "integrated systems", but an integrated system is a limited concept compared with the more powerful and more flexible concept of linking systems.

(iii) The "Linked Systems Protocol" originated in a project to link the largest central systems of the USA. This is important, but, I believe, the greatest benefits will result from the adoption of linking protocols in smaller countries and in smaller libraries. There are more smaller countries than large ones and more small libraries than large ones. The logical conclusion will be to make the "Linked Systems Protocol" part of the software on the microcomputer of the individual researcher, the "scholar's workstation", so that the individual scholar can search anywhere that is permitted.

An important step is the development of national linked systems protocols. It is also very important that they are compatible internationally and can interoperate. That, like the MARC format, would transform the practicability of international bibliographic cooperation. National use of a linked system protocol can or, at least, should be able to assume the use of common standards for cataloguing rules, subject headings, alphabets, filing rules, etc. International use of a linking protocol cannot make these assumptions.

interesting and important problems arise concerning character sets and equivalences between cataloguing rules, etc. [7]. The possibility exists, but as always, successful international library cooperation to benefit library users will first require international cooperation in developing the necessary standards.

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OPEN SYSTEMS INTERCONNECTION (OSI): PROBLEMS AND POSSIBILITIES FOR THE FEDERAL REPUBLIC OF GERMANY

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OPEN SYSTEMS INTERCONNECTION (OSI): PROBLEMS AND POSSIBILITIES FOR THE FEDERAL REPUBLIC OF GERMANY

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Abstract

The paper describes possibilities for the implementation of OSI in the Federal Republic of Germany. While the technical layers of OSI are supported by the German packet-switched communication network DATEX, no efforts are so far made to implement the application dependant parts of the OSI Model. A concept for OSI implementation is designed. For the following areas OSI applications are outlined:

- Cooperative maintenance of authority files, especially the 'Gemeinsame Körperschaftsdatei' (corporate headings) and 'Schlagwortnormdatei' (subject headings)
- Data exchange between 'Verbundkatalog maschinenlesbarer Katalogdaten' (VK) and regional systems
- Interlibrary loan
- Computer-to-computer links between regional networks and local systems

Barriers to OSI implementation are a deficit in knowledge on OSI possibilities and benefits and a lack of protocols for the various applications. OSI applications are further complicated by the old structure of software installed in the bibliographic utilities, so that OSI will require a redesign and reimplication of programmes for the online system.

OPEN SYSTEMS INTERCONNECTION (OSI): PROBLEMS AND POSSIBILITIES FOR THE FEDERAL REPUBLIC OF GERMANY

1. Introductory remark

A paper on the possible implementation of OSI in the Federal Republic cannot ignore the present state of library networking and the realities in library automation. Part 1 contains a brief presentation of the networking concepts and current issues in networking, followed by some critical observations. In Part 2 a scenario for OSI implementations is presented and some obstacles for OSI applications in the Federal Republic are identified.

This paper contains my personal view on networking politics and OSI projects. This view is not necessarily agreed by the Deutsche Bibliothek.

2. Present state of networking

The recommendations of the Deutsche Forschungsgemeinschaft on the establishment of regional networks with regional service and computer centres published in 1980 were several times mentioned during this Symposium. They are indeed regarded as the Magna Charta for the networking policy in the Federal Republic. All institutions involved got a specific role to play. In the regions: the network centres, at the national level: the Serials Database (ZDB) and the Cooperate Authority File for Corporate Bodies (GKD) and the Deutsche Bibliothek as a distributor of bibliographic data.

The recommendations follow strictly the regional principle and rejected the idea for one single nationwide network system. Thus the concept corresponds with the federal structure of West-Germany where the large academic libraries are under the authority of the States (Länder). In addition to the political realities a lot of technical reasons determined this concept. One argument was that no national network centre could provide the services required for all academic libraries in the Federal Republic especially the maintenance and production of catalogues. I must confess that I found myself among the advocates of regional systems. A centralized catalogue production, for instance the production of COM catalogues for all libraries seemed to me technically unfeasible, although the idea of a national database has not yet lost its fascination.

Regional level

The regional utilities apply in general the same database management functions. A centralized database where a bibliographic record is stored, ideally, only once is shared by the member libraries. Some systems implemented an authority control for personal names and corporate bodies. At present the implementation of the authority file for subject headings of the Deutsche Bibliothek is under discussion by several networks. The regional networks provide only online cataloguing functions. There are no further plans to extend these to interlibrary loan (ILL), acquisition, serial check-in, etc. Holding information and local data are maintained in separate files which are linked with the bibliographic records. All regional networks are star networks comprising single central processing facilities to which each user is connected in a direct point-to-point fashion.

There are telecommunication connections between some regional systems and the DBI host, but there are no network functions between the regional systems or between regional systems and central utilities.

National level

a) Deutsche Bibliothek

The Deutsche Bibliothek has in relation to the regional networks a distribution function and supplies bibliographic data in machine-readable form for the German Bibliography and the British National Bibliography in the German exchange format MAB. For the exchange on an international level the UNIMARC Format is applied. Authority records for corporate names linked with bibliographic records are also distributed. The tape service will be extended very soon to authority data for subject headings.

b) Serials Database (ZDB)

The ZDB is the national database for periodicals housed in the Deutsche Bibliotheksinstitut (DBI). The ZDB-participants are connected via terminal with the DBI and input/update data online in accordance with agreed-upon practices. The redistribution of serial records to the regional systems is accomplished by downloading on magnetic tapes and uploading into the regional databases.

c) Authority File for Corporate Names (GKD)

The GKD is cooperatively maintained by the Staatsbibliothek Preußischer Kulturbesitz, Bayerische Staatsbibliothek, Deutsche Bibliothek. The GKD supplies established forms for corporate headings and the file is a key to consistent bibliographic records in the regional systems. The ZDB and the Deutsche Bibliothek maintain in the bibliographic data links to GKD records. The three GKD-participants input and update records in the GKD directly by dedicated terminals. They receive new and corrected records back on magnetic tape to update their own GKD duplicates. These procedures cause some consistency problems since it is nearly impossible to keep different files congruent.

d) Verbundkatalog (VK)

The VK contains machine-readable records for monographs of regional networks and several academic libraries. The regional databases are downloaded on tapes, mailed to the DBI where the data is converted and merged together. In this process duplicates are removed by programmed identification checks but without human intervention. The data is cleaned as far as possible. The online version of the VK is under development. The VK shall be used then for the retrospective conversion of catalogues.

Considerations

The project to build up the VK as an online database - Heinz Habermann called the VK already a national database - rises some questions.

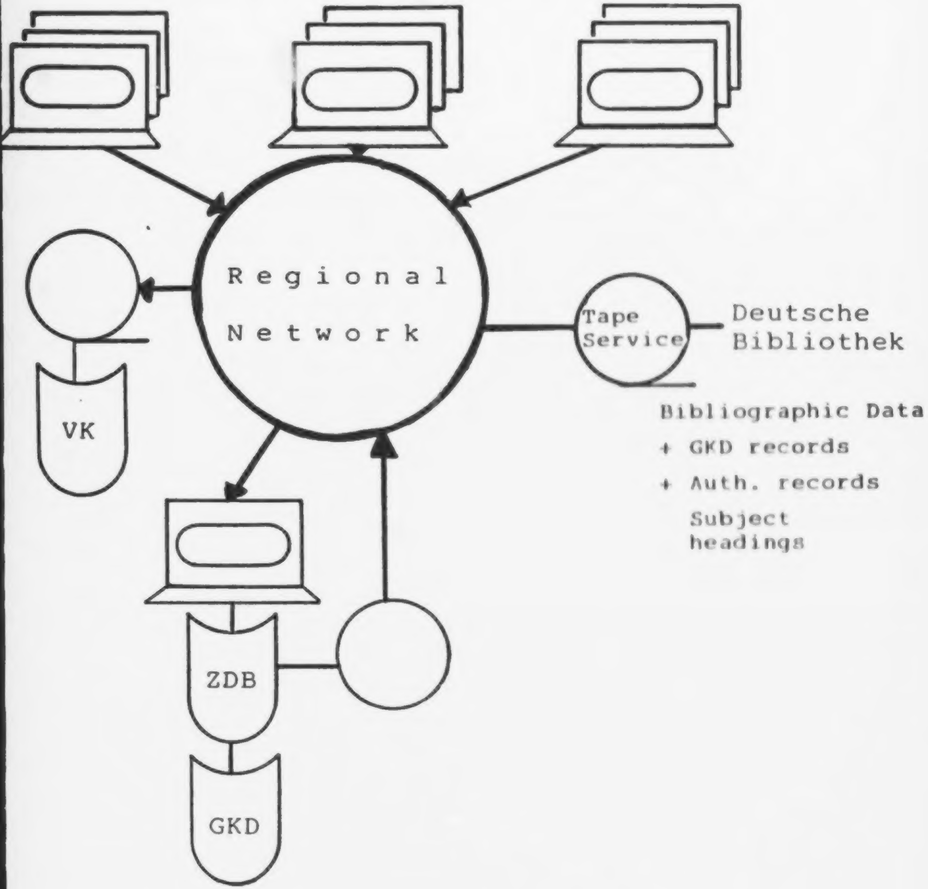
How does this project fit into the regional concept of networking? It seems to me that the decision for regional databases shall be now partially revised. My conclusion is:

- if the concept of 1980 was wrong, then we have to build up a central database
- or the concept of 1980 was right then the Verbundkatalog as an online database is obsolete.

I see another challenge to regional systems in the trend to more and more decentralization. The DFG presented in 1986 a conceptual plan for the installation of local systems and thus set an important incentive for the decentralization of services. But we built up the regional systems as service networks. If more and more decentralized local systems will be installed in the next years where is then the need for regionally centralized processing? There are some inconsequences in our networking policy, I guess.

Regional Network

Member libraries



Regional
Network
VK
Tape
Service
Deutsche
Bibliothek
Bibliographic Data
+ GKD records
+ Auth. records
Subject
headings
ZDB
GKD

3. OSI concept

I do not have the intention to discuss here the technical aspects of OSI. My interest is the OSI concept and the implications for networking in the Federal Republic.

OSI activated not only standard organizations, telecommunications and computer industries. In projects like the Linked Systems Project LSP in the United States, BIBNET in Norway or the ILL Protocols in Canada - to mention only the most important - OSI drafts and standards were developed and implemented. The world-wide OSI movement has of course also reached the Federal Republic, but - strange to say - not effected the libraries or lead to discussions on network concepts and automation planning. Our library journals ignore the theme and it is hopeless to search the topic in the programmes of library seminars and conferences. It is extraordinary when OSI standards and implementations attract the attention in professional meetings. Very often the discussions quickly ran aground, because some people believe that all libraries and bibliographic utilities once will have the same hard- and software, probably Siemens, and for homogeneous systems OSI is not necessary. A second group is occupied to develop its online system and does not have time or interest to think over the future. The third category at least has clear ideas, may be illusions on the application of OSI for the linking of systems and networks, but they fail in persuading the other that a long-term investment in the implementation of OSI in the Federal Republic will be worthwhile.

This behaviour of the library user group is in contrast to the implementation of OSI standards by the computer and telecommunication industries. The Deutsche Bundespost provides the packet-switched network DATEX-P including basic services for information exchange and is going to build up the digital network ISDN (Integrated Services Digital Network) with a complete infrastructure for wide-area-networks with the ability to transfer all types of data.

Telecooperation between universities have some tradition in Germany. Already in the 1970's some universities linked their computer systems to share resources and services. At least in 1984 in German Research Network DFN was founded. Goals of the DFN are to establish, in close cooperation with hardware and software vendors, a set of communication services for users out of the academic and scientific area. These basic services include terminal oriented dialogues, remote job entry, file transfer and virtual terminal protocols.

With the fast increase of decentralized systems and services and new requirement on the national and international level the current form of networking and data distribution is no longer an adequate solution. Required is a communication between different systems installed on heterogeneous computers. Within the OSI open system network concept each system should be able to communicate with each other. This means with relation to the situation in the Federal Republic, communication between the following types of systems:

Local with regional
local with local
regional with regional
regional with central/national
central with central.

For the realization of this model enormous efforts have to be undertaken. There is on one side the development of standards and protocols for the 7th layer in the OSI Model to make a communication between different applications possible. On the other side the technical challenge to implement these standards in existing or newly developed systems.

There are protocols and standards for the following functions under development by ISO TC 46, some of them based on national standards and it is realistic to plan their applications in the near future:

1. Intersystem searching or information retrieval to access remote databases
   Information retrieval enables the user of one system to query a remote system through his own system and receive the response from remote system through his own system.
2. Record Transfer
   The Record Transfer capability supports the intersystem transfer of any type and any number of records.
3. Update Service
   Allowing a system to request an update in a remote database, so that one record may be updated, inserted or deleted from that database.

OSI-Scenario for the Federal Republic

The question I would like to rise here concerns the implications of the OSI protocols on the network concept and structure in the Federal Republic. A study funded by the Deutsche Forschungsgemeinschaft will investigate potential library applications. I will present here my 'scenario'. I like this word because it doesn't hem my fantasy and is not so ambitious as the term 'concept'.

Since I am more involved in the national level of networking, I would like to start with the implications for the central national services.

Implications for the central national services

A possible implementation for OSI-protocols is the cooperatively maintained authority file for corporate names GKD. The application should have the following features:

- the GKD participants in Berlin, Munich and Francfort link their computer systems
- the target-system in this scenario is the GKD-Database at DBI-host
- the source-systems are Francfort and Munich
- the GKD-Database in the target and the source-systems is identical
- the two source-systems applys intersystem search and record transfer
- new, corrected or deleted authority records are transmitted via the Update Service
- the target-system distributes updated GKD records in an open system network to the regional systems.

This conceptual model could also be applied for other types of data, e.g. for the authority file of subject headings.

Not much fantasy is required to forecast that by the end of the decade or the early 1990's the data distribution by tapes will be replaced by file-transfer procedures. These projected changes will refer to the tape service of the Deutsche Bibliothek and the tape distribution by the DBI.

Implication for regional and central utilities

I will concentrate here to the present form of data contribution to and distribution from the ZDB. Within an OSI environment a complete different model could be applied. In this scenario the member libraries of the ZDB input/update data through their own systems directly in the ZDB.

The new and updated records are after one transaction immediately transmitted from the ZDB to the source-system where it can be stored immediately in the own database. In this case the cataloguer has to know only the input format and the user interface of his own system. The direct update in both systems, ZDB and source-system, make time-consuming tape-loadings unnecessary. And, in addition, consistency between the central and the regional database can be achieved which is nearly impossible in a batch-oriented distribution by tapes.

Open systems network

In this scenario all systems are linked with each other. Local systems with regional utilities, regional systems are interlinked and are connected with central utilities.

In such an environment cataloguing or retrospective cataloguing could be realized as follows. The cataloguer enters a search key for a given book, the system checks 1) the local library catalogue, 2) in the regional database. If the record is not found in these files the search can be forwarded automatically through successive systems. The order in which other databases shall be searched can be predetermined. It could be for instance the database of the next situated regional network.

This scenario corresponds completely with the DFG-Plan of 1980 in which the interlinkage of regional systems was projected in one sentence and is in keeping with the concept for local systems.

In connection with OSI the definition of "national database" and a concept for the national database is not necessarily a database physically housed in one computer system. The national database is a logical database which can be built by linking various databases. For the Federal Republic the question of a national database is in my opinion definitely decided: For serials with Yes, for monographs with No. From my point-of-view this decision is irreversible. In relation to our network concept and with view to the OSI technology one has to evaluate the project for the Verbundkatalog as an online database. There is only one reason to establish this database, we do not have an OSI concept and implementations. Otherwise we would reach the same goal and benefits by linking the regional systems. It is my personal opinion that we apply the wrong methods. We build up with the methods of the 1960's and 1970's a central database by merging existing online databases.

Barriers and perspectives

I close my song of praise for OSI and return back to earth where we have to face the barriers to the implementation of OSI in the Federal Republic. There are many, I will only identify some.

1) The missing understanding on the OSI concept and the lack of knowledge on the OSI technology is one obstacle to OSI applications. As long as libraries believe that they can ignore OSI and cling to their established modes of information distribution no OSI project can successfully be carried out.

2) We ignore at present totally the developmental work in the appropriate standard committees for application level protocols. The Federal Republic is not represented. Problems will appear I expect in some years when application layer protocols will attain the status of an international standard and our specific requirements are not covered.

3) There is not yet any investigation on if and how our software systems can be opened for OSI applications. This software was mainly developed in the 1970's and does not in all cases correspond to software standard required for an open system.

4) OSI implementation is a long-term programme and visible results are not directly to be seen. Decision-makers and funding bodies should recognize this from the beginning.

There will be much work ahead. We should meet this challenge and think in new dimensions. Thus, we will make effective use of the OSI technologies in the 1990's.

COMMUNICATION CHANNELS AND NETWORKS: FACILITATING INFORMATION TRANSFER AND EXCHANGE

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Abstract

People communicate for a wide variety of motives and purposes and in a wide variety of ways. The simplest model in the communication process shows that there must be an information source, a suitable channel and a receiver of the information. Following a discussion of the reasons for communicating, the nature of communication and factors in and barriers to its flow are outlined and a model detailing the steps in the process of communication is given. Communication itself may be formal or informal, oral or written. Three major forms of communication channel can be distinguished: a) published papers and books; b) attendance at conferences and other formal meetings; and c) informal, usually verbal, contacts. This latter category can be extended to include electronic communication - though in fact this could be considered to cut across all three categories with the formal submission of electronic manuscripts for editing, refereeing and publication; with computer conferencing and with electronic mail and computer-based research networks. The characteristics of some of these channels are discussed and a number of electronic information exchange networks, which facilitate and enhance communication between peer individuals and groups in the library and information field as well as other areas are described.

COMMUNICATION CHANNELS AND NETWORKS: FACILITATING INFORMATION TRANSFER AND EXCHANGE

1. INTRODUCTION

People communicate for many factors. Mitchell (15) lists a number of motives which include: the necessity to reduce uncertainty or to confirm beliefs; to solve problems; to have control of a situation; and to provide feedback. Thus, people communicate or fail to communicate in order to achieve some goal, to satisfy some personal need or to improve their immediate situation.

These motives lead to the purposes of communication, a primary one of which, within an organization, is to digest and classify all the information coming into it and to assist in the development of ideas and solutions to an organization's problems. Another purpose is to develop the information and understanding necessary for group efforts and to provide the attitudes necessary for motivation, cooperation and job satisfaction. Communication thus arises from the pressure towards uniformity which may exist in a group due to social reality and group locomotion. A major function of communication, then, is to inform: to keep staff informed of organizational developments and factors and events affecting their jobs and lives.

Communication can be formal or informal. Generally, formal communication is considered to be communication via published channels (journal articles, conference papers, reports, books and the like). A number of writers refer to this as scientific communication. Such channels are not conducive to interaction and demand a certain responsibility - a finishing and polishing of the final article, which tends to lead to long publication delays. For some, formal communication occurs when, say, a meeting is called for a given time and place to discuss a given topic. Formal communication may, thus, be public and oral or written. Informal or interpersonal communication may also be oral or written. A chance meeting in the corridor or a chat over lunch is considered informal as is a quick visit to a colleague's office. The grapevine by which rumours and generally accurate but incomplete news gets around an organization speedily is usually oral and informal. On the other hand, the sending of an internal memo is often considered informal whereas a letter being sent outside the organization is official and thus formal.

The advent of electronic mail and computer conferencing systems can also be considered methods of informal communication.

Communication within an organization will tend to create a smoother work flow and foster better interaction among staff. Since, however, one party is the sender and another is the receiver, then personal relationships come into what is sent and received. These relationships are often a prime cause of breakdown in communications and thus may constitute a barrier to efficient communication.

2. REASONS FOR COMMUNICATING

Scientists and engineers, librarians, people in general communicate with others for a number of reasons. They may want to gather or provide input; they may want to inform or provide feedback or be informed; they may want to motivate or persuade others; they may be selling or promoting something; they may be giving instructions or orders, or educating or training someone; they may be giving or being given advice or assistance.

Over the years there has been an increase in communication caused by a greater demand for information. This has been brought about by the emergence of new disciplines and specialities like space exploration, nuclear energy, telecommunications, oceanography; by the emergence of new technological countries, e.g. Korea, Taiwan, Brazil; by an increase in research activities; by the introduction and convergence of new techniques, technologies and equipment, e.g. computers, data networks, accelerators; and by the creation of work teams to handle large complex programmes and projects.

Menzel (14) notes that more scientists are demanding information faster, from a wider geographical coverage, and over greater cross-disciplines. He goes on to note that the purposes of information include keeping the scientist up-to-date (current awareness function); furnishing him with the most recent answers or references; furnishing him, on demand, with reports on given subjects over time (retrospective search function); brushing up knowledge of an area; and stimulating him to seek information outside his defined field.

Traditionally, scientists have made their research and work known via conferences and publications. Published scientific papers contain a record of the development of a discipline and are the means by which the accumulated knowledge of that discipline is transmitted among members and added to the discipline stock. This is one reason why scientists communicate. Another is that the scientist needs to establish priority on his work; another is that he is bound by the system to publish - which causes a superabundance of papers and thus aggravates the communication problem.

Formal publication of work in journals and reviews, however, very often takes far too long - it is necessary for a permanent record, but is deficient as a current awareness source for research activities. The growth in literature leads to a disinclination on the part of the scientist to depend on published sources - instead the trend now is for many scientists wanting to obtain information on new, ongoing or recently completed work relevant to their interests to place an increasing reliance on informal communication with those that share their interests. Such communication is increasingly being carried out by computer-based research networks such as BITNET.

Hagstrom (7) points out that informal contacts may induce solidarity in organizations conducting research since such informal communication between potential collaborators often takes the form of successively greater commitments to cooperate. He goes on to state that spatial propinquity is a factor leading to collaboration since it is likely to lead to informal communication. Because some scientists or staff work in virtual isolation or give support when required to a project they are said to be rootless within the organization. The librarian or information officer in an organization can be considered to be rootless because s/he may possibly be the only professional librarian within that organization. Similarly the librarian in an academic institution may feel left out by the lecturers; indeed, even in the public library sphere, the librarian might feel an outcast within the vast community outside. This feeling of being in an organization or a team, but not really belonging to or being part of it, plus the technical need to become knowledgeable and keep abreast of current information, provides an immediate motive and rationale for communicating by striking up contact and relations with others.

3. COMMUNICATION AND ITS FLOW

a. The Communication Process

The process of communication can be considered to consist of five steps (9). Step 1 includes the creation of the idea by the source providing the basis of a message. In step 2, the encoding of the idea/information into words or symbols suitable for transmission to the receiver takes place. These words or symbols constitute the message. In step 3 the actual transmission of the encoded information is done. It can be done in a variety of ways - orally, in writing, symbolically, by acting and using a certain channel, e.g. letter, telephone, electronic mail or even the stage. Step 4 is the decoding process where the message is interpreted and given meaning and substance.In this step reception and understanding of the message by the receiver are included. The fifth step - feedback - permits the source to know whether the message/idea has been received and understood and what effect it had. Action on the part of the receiver in response to the communication is sometimes added as a sixth step.

b. Patterns of Communication

In the pursuit of their work goals, people have forces acting upon them to communicate with those who will help them achieve their aims, and forces against communicating with those who will not assist, or may retard their accomplishment. Thus, to a large extent, communication - informal communication - will flow along friendship lines since trust implies freer information content. Such communication is therefore more personal between individuals and hence more interactive. Such communication is also more likely to take place horizontally or laterally between peers who have a greater awareness of interests and needs and attitudes and pressures.

The communication structure of an organization approximates a network of relationships of individuals in groups. A group is a collection of individuals who have relationships to one another that make them interdependent to some significant degree. People in an organization can be formally structured into different groups according to their work or professional similarity. There are various attributes to these relationships, for example, structural (vertical/lateral); organizational function (orders, information exchange, decision-making); spatial location; content; psychological concomitants (perception, motivation, expectation, satisfaction); frequency; continuity and medium.

The corner-stone of any group, and hence, any organization since it is composed of groups, is the communication or interaction which must take place within and between the group and its members. It is communication which provides the means for making and executing decisions, obtaining feedback and correcting the organizational objectives and procedures as well as carrying out the necessary research and development work. If a collection of people engages in interaction frequently and over an extended period of time, it is likely that their interactions will become patterned. There is a marked tendency for people to communicate more frequently with those who communicate with them frequently than to those who communicate with them infrequently. Among the better known designs of communication network are circle, wheel and chain. Each of these gives different degrees of accuracy in information transfer, speed, flexibility, job satisfaction and leadership.

Some individual staff will play an important role by being a go-between or liaison between nodes of a communication network. This is particularly the case when these individuals are in contact with bodies outside the organization. Organizations in general and R&D organizations in particular, are dependent up on the timely and accurate information from a variety of external sources. The organization's boundaries can be effectively breached to allow such information in by individuals acting as bridges linking the organization's members to the outside. Such boundary-spanning individuals are termed gatekeepers.

Gatekeepers are required, according to Tushman and Katz (22) because of the differences in language, cognitive coding, levels of understanding, "in-ness" (being in with the in-crowd) and to counteract communication impedance, distortion and bias. Studies have revealed that gatekeepers possess a number of attributes. They are able to gather and understand external information and translate it into terms that are meaningful and useful to colleagues. Gatekeepers generally produce a large number of papers, are cited more, read more, tend to be first line supervisors, attend more conferences, have more outside contacts, are relatively high performers and have higher qualifications. It is a strong possibility that gatekeepers are among the more active users of electronic mail and computer conferencing systems.

Gatekeepers by virtue of their reading and publishing habits will be at the forefront of their research field. The people they are in contact with, outside the organization will also be at the forefront of the field. Thus they form an elitist communicating, highly productive group. Such a group may be termed an invisible college whose members as well as communicating with each other, set priorities for research and monitor the rapidly changing structure of knowledge in their fields. In addition, this unofficial group of everybody who is anybody in a segment of the research field, will send preprints to each other,collaborate and communicate at conferences. Invisible colleges effectively solve a communication crisis by reducing a large group to a small select one of the maximum size that can be handled by interpersonal relationships (c. 100 people). Thus the scientific community becomes an important channel for informal communications as a way of keeping current and aware and without the delays imposed by scientific and technical publications. Increasingly, such informal communications are taking place via computer research networks like BITNET and EARN.

c. Channels of Communication

Three major forms of communication channels can be distinguished: a) published journal and conference papers, reports and books; b) attendance at conferences and other formal meetings; c) informal, often verbal, contacts. In discussing the properties of communication channels, Ramstrom (18) identifies the following main types of channel: formal and informal, vertical and horizontal, internal and external, one-way and two-way, symmetrical and asymmetrical, in-channels (transmitting information to decision-makers) and out-channels (transmitting description of decisions made). A given communication link has a number of properties including symmetry, strength, reciprocity and connectivity. Symmetry occurs when two people interact on equal terms, for example in a conversation or message exchange where both take part equally. Asymmetry occurs when the exchange is unbalanced for instance by one giving and the other receiving information rather than a mutual interaction - as is often the case in a normal electronic mail or computer conferencing exchange. The strength of the link relates to the degree of frequency and length of interaction; while that of reciprocity deals with the degree of agreement between the two parties. Connectivity refers to the total number of possible channels that exist between a given number of nodes or people. Other link properties include the content of the exchange (e.g. facts, ideas, gossip); the medium (letter, phone, electronic mail, face-to-face, etc.); reliability (which affects the correctness and precision of the information received); the speed (which influences the topical quality of the information content); and the capacity (which determines the completeness of the information sent through the various media (oral direct, oral indirect, written direct, written indirect)).

4. BARRIERS AND BREAKDOWNS IN COMMUNICATION

Communication is impeded by five broad types of barrier - physical, technological, personal, semantic and economic. Physical barriers are environmental factors which effect the sending or receiving of messages/information. They include the spatial location of the individuals or members of a group, i.e. the physical distance between them - they may be on another floor, in another part of the building, on a different site, in a different country. Time differences also play a role here. It is also difficult to get the right people together at the right time for a conference - whether ordinary or a video or teleconference. Political and legal barriers which prohibit the flow of information to, from and within a particular country may also exist - these can lead to cultural alienation. Another physical impediment is distracting noise. Yet another, in the realm of formal scientific communication, is the delay in publication of a paper. Too many links in the reporting chain constitute a further physical barrier.

Technological barriers occur, particularly with electronic mail and computer conferencing, because of network unreliability, line noise and distortions, and general equipment problems as well as non-user-friendly software and features which differ from system to system. Electronic communication, of course, has grown partly because of another technological barrier - the mail delays and irregularities caused partly because the existing systems cannot cope with the volume of traffic. On the other hand, it can be expensive to provide the necessary hardware and software and resources and infrastructure for communicating electronically. One other technological barrier is the horrendous array of characters and symbols one must enter in order to correctly send a message or file via one of the computer networks like EARN or JANET (see examples in ref 17). The problem is compounded when one is communicating with someone on a different network. It makes the old EURONET procedure look like child's play!

Personal barriers arise from a whole host of judgements, views, prejudices, emotions, values of individuals. Their personalities, likes and dislikes, jealousy, competitive spirit, job function, may cause them to filter or distort or omit or delay messages. There may be a reaction to the person wielding the authority or the responsibility; there may be a threat to a person's status or ego. In international organizations there can be real conflicts relating to cultural factors. What is acceptable behaviour in one culture or race may be totally alien and unacceptable to another. Some organizations too, operate on a "need to know" basis, which, if you are not in the know, can cause difficulties.

Semantic barriers refer to the linguistic abilities of those wishing to communicate and the limitations of the language or other medium used to exchange the message. The foreign language barrier currently still poses a significant threat to scientific communication. Consequently, there can be misunderstandings which may be overcome by using other forms of communication, for example, drawings or gestures. One further breakdown in communication can occur with the amount, rate and complexity of information which an individual or group receives. If the quantity or complexity of information is too great or if it is delivered too fast or not clearly it can lead to overload with which the system's or user's information processing capacity cannot cope.

Economic barriers reflect the cost of having or providing access to communications facilities. Communication can be expensive in terms of both the equipment required (for telephone, telex, electronic mail, computer conferencing) as well as human resources (time to prepare, type, correct memos, letters, reports - whether on paper or online). Time and hence money is often wasted in vainly trying to reach someone by telephone. Another economic barrier is occasioned by the expense of travel and the time involved in participating in meetings. Not only do the costs form a large portion of an organization's information budget, but they are also sufficient to prohibit attendance at international meetings.

5 COMPUTER COMMUNICATION NETWORK CHARACTERISTICS

As was noted earlier three major forms of communication are publishing; participating in conferences; and informal contacts. Electronic or computer-based communication, an effective method of maintaining interpersonal contact, can be included in this latter category, although it is interesting to note that it can, in fact, be considered to cut across all three categories. Formal submission, refereeing, editing and publishing of scholarly papers can be carried out via computer networks (e.g. BLEND). Furthermore, the posting of notices on bulletin board systems can be considered akin to small ad columns in newspapers. Meeting and conference participation can be effected by teleconferencing systems (e.g. ADONIS) or by joining, for example, the computer conferences which exist on say The Source or EuroKom; and, of course, electronic mail can be used for the informal communications.

Computer-based communication serves to widen access to information; overcome social distinctions of race, colour, sex, rank, age etc; reduce or eliminate social barriers and so create equality; eliminate anonymity; and foster a strong sense of group identity based on informality, intimacy and attachement (16). Many groups of networks of individuals have been and are still being established - and these are wider than the organization itself. Pfaffenburger goes on to characterize such research networks as having a small membership, a narrow international focus, a wide geographic dispersion and emphasizing informality. Such networks contribute to the intellectual process of research, e.g. by disseminating results rapidly and informally.

Computer networks are not only based on mainframes, but on personal computers too and thus they are more readily available to many. They offer a wide range of services including electronic mail or message transmission; transfer and exchange of files, text and programs; remote system and database access; interactive services; provision of bulletin boards and newsletters; job submission and execution; and teleconferencing. Landweber indicates a number of benefits of research networks: they give an increased opportunity for collaboration between geographically dispersed individuals; they enable the sharing of resources; they provide rapid dissemination of reports and research findings; they permit easy access to information; they stimulate the development of special interest groups; and they lead to the development of special services (10). And of course, they enable time zones and geographic separation to be overcome, as well as allowing both sender and receiver to work (i.e. write, read and react to texts and messages) at their own pace and convenience.

On the other hand there are a few disadvantages, some of which are peculiar to computer-based communicating and some of which are not. Users have to develop the habit of looking into their mailboxes regularly for the full benefits of computer communication to be apparent. Mailboxes are amenable to junk mail and if a user belongs to several computer conferencing systems then his mailbox can rapidly fill up with the result that messages are skipped or else an inordinate time is spent in trying to keep up.

Within electronic information communities there are five principal means of linking geographically scattered common interest groups. These methods all come under the generic term of teleconferencing and are: audio teleconferencing; audio graphics; videoconferencing; electronic mail; and computer conferencing (1). All five systems can depend on the computer as the medium for information transfer and exchange. The first three systems, though, depend on voice communications and are conducted in real-time, while only electronic mail and computer conferencing proper are without geographic and time constraints - although, of course, a computer conference can be set up in real-time and electronic messaging can take place synchronously.

Computer conferencing is a means of facilitating communication among people or organizations which are geographically remote from each other, but which share common research interests and activities. Communication can range from being merely simple social chit-chat, through the transfer of files, to the production of fully-refereed and edited conference proceedings or electronic journals (1). Users can enter and exit at any time during the communication process to read texts and messages, make comments, or leave notes for others.

6 SOME COMPUTER COMMUNICATION NETWORKS

Computer conferencing and electronic mail systems are springing up all over the world - some are intended for public proper access, e.g. MCI Mail, The Source, Telecom Gold; while others are more restricted in nature, e.g. DialMail (for DIALOG users), DataMail (which is the main vehicle of information exchange between members of EUSIDIC), or the United Nation's DEIN (DESI (Dept of Economic & Social Information) Electronic Information Network)). Some typical computer-based communications networks are described below - the article by Quarterman and Hoskins (17) also gives a useful overview of a much larger number of computer networks. As the descriptions below show, it is not always easy to classify a network into one category or another since many offer both conferencing and electronic mail facilities in addition to other services.

The examples which follow have, therefore, been grouped into networks relating to the scientific community and networks aimed more for the library and information community.

a. BLEND

Following experiments in the United States of America in the late-1970s into computer conferencing and its place in scientific and technical communication, in order not to fall behind in this field, the British Library Research & Development Department approved a proposal to establish an experimental programme in electronic network communication via the public telephone system. Birmingham University provided and developed the necessary hardware and software facilities, while Loughborough University developed the documentation, organized the training and provided the initial information community of some fifty scientists.

The programme, BLEND (Birmingham and Loughborough Electronic Network Development), started out with the aim of exploring and evaluating the usage of an electronic communication network as an aid to writing, submitting and refereeing papers (19) - in other words to experience the problems of setting up and using electronic journals within the scientific community. The project had a three and a half year time-scale starting in 1981 and was based on the computer conferencing NOTEPAD software. Participants were supposed to submit one long paper and one short paper in each year of the project in the common interest subject area of Computer Human Factors.

From the start various methods of providing papers were foreseen, such as directinput from terminal; manuscripts being sent to another centre for online or OCR entry there; uploading the text from microcomputers; or the text being sent on floppy disk or magnetic tape. It was envisaged that various types of journal and communications would be explored during the project including fully refereed papers; short discussion papers (stimulated by an accepted refereed paper); annotated abstracts (short critical summaries of papers members read); news and bulletins of member activities; cooperative writing of papers; chit-chat etc.

Initially, progress was made with the refereed papers, discussion papers, news and chit-chat - a mixture of formal and informal communication. Thus BLEND's place in the traditional publishing cycle embraced the writing, revising, submission, refereeing, editing and accepting of papers for publication in an electronic-form only journal, Computer Human Factors. Each participant had access to the host computer from his terminal over the public telephone network. The system and software provided private working file sections for each user; facilitated messaging between participants (whether in an author/editor/referee situation or not); enabled computer conferencing; and held public files of accepted papers which constituted the online journals. After preparing a paper, the author submitted it through the system to the editor, who registered it and forwarded it to referees, who found it waiting for them next time they logged on. Refereeing involved sending comments, either personally or anonymously, over the network to the author directly or to him via the editor. When the paper was finally accepted (after any modification) it was then transferred to an archive file where it could be accessed by any member in the user community (20).

After the first couple of years it was found that about one-third of the participants were regular users; one-third were intermittent users; and one-third hadn't even entered the system. Those who used the system regularly wanted to continue to do so because they found, for example, that electronic communication encouraged easy reader discussion on a paper in a way that was not possible before. Furthermore, it was discovered that the process of co-authoring could be facilitated and improved. On the other hand, the median time for publication within BLEND was eight months - much longer than many thought acceptable. Fewer articles than anticipated were submitted and published.

b. ELECTRONIC INFORMATION EXCHANGE SYSTEM (EIES)

The Electronic Information Exchange System (EIES) at the New Jersey Institute of Technology is an experiment in computer-mediated communications utilizing online messaging, bulletin boards and conferencing plus database searching. It currently has over 100 users scattered throughout developing countries who participate in educational programmes - a kind of distance learning (6). Twelve research institutes from nine Latin American countries in the United Nations University (UNU) biotechnology research project on brucellosis are using EIES to communicate among themselves and with other cooperating institutions outside Latin America.

c. INSIS

INSIS (Inter-institutional Integrated Services Information System) is a priority project of the Commission with a budget of 1 million EAU for studies alone. INSIS has as its aim the improved communication between the Commission of the European Communities and its Member States with the idea of cutting down some of the vast paper flow and expense of meetings. Two of the main objectives of INSIS are:

- to bring about a general improvement in the effectiveness and working conditions of government officials throughout the Community and to ease communication problems

- to develop an advanced information and communication system for Community institutions and key government departments.

INSIS, which is still getting underway, will make use of public telecommunications services to provide fast and reliable information transfer. Gradually, INSIS will evolve, it is hoped, to an ISDN (Integrated Services Data Network). The services being talked about include phone, telex, audio conferencing, data transmission and fax at a first level with electronic mail, word processor exchange, video-conferencing, image and voice transmission and telemetry at a second. The network projects are intended to lead to the digitalization of existing networks, the introduction of satellite and optical fibre links, and the development of local area networks. These could then be interlinked into a single ISDN providing a complete range of services with high speed data transmission. Priority areas include electronic transmission of written documents and messages to reduce delivery delays between Member State administrations and the CEC institutions; database access to Community information; and the establishment of videoconferencing facilities to cut down on unproductive meeting travel time as well as costs. INSEM (Inter-institutional Electronic Mail System) is already in an advanced stage of development as are the videoconferencing faculties (2). An experiment has also been proposed for the creation of an electronic link between the Greek administration in Athens and the Commission in Brussels for the purpose of transmitting written documents between them.

d. EUROKOM

As part of the CEC ESPRIT programme an information exchange system has been established for use by those working on ESPRIT projects. The system is known as EuroKOM and is a computer conferencing facility provided from the Computer Centre of University College in Dublin. The system is based on the computer conferencing system KOM which was developed by the QZ computer centre in Sweden. Established in 1983 the EuroKOM organization provides a centralized computer service to several thousand pc and terminal users in a dozen or more countries. Facilities include electronic mail for keeping in touch with colleagues; computer conferencing along structured lines for collective discussion of projects; pc file transfer with no incompatibility problems; telex interconnection; gateway access to other networks; and access to databases relating to ESPRIT and CEC activities. Having proved successful as a means of communication among ESPRIT project teams, the network is also being used by other multinational groups requiring a high interaction with members.

e. EARN (European Academic Research Network)

EARN is a computer network between academic institutions (universities and colleges) and research centres for the purposes of world-wide communications. World-wide covers Western Europe, the Middle-East (GULFNET), the USA (BITNET), Canada (NORTHNET), Japan (JUNET), South-East Asia and Australia. Access is currently being resisted for Eastern European countries. EARN consists of a set of independent host nodes connected by leased telephone lines with a central computer in each country providing international connectivity. Once a national centre has been established in a particular country, many local universities or centres can join at the same time. EARN is a store and forward network utilizing the transmission techniques of the JES3/JES3 or RSCS sub-systems of the IBM operating systems MVS and VM respectively. Emulations are available for several non-IBM systems including Siemens BS2000/BS3000, DEC VAX VMS or UNIX and CDC Cyber NOS. Three basic functions are available: transfer of files, texts and programs; job submission, execution and output recovery; and transmission of messages and commands. Gateway access is also provided to other networks such as BITNET, ARPANET, CSNET and JANET.

EARN started operations in 1983 using similar programs and rules to BITNET - a US inter-university telecommunications system set up in 1981 and now connecting some 800 computers at 190 institutions in the USA and 214 abroad. EARN was initiated and operated by IBM which is covering the costs of the international and some national PTT lines plus central node computers for four years (until the end of 1987). The idea behind BITNET and thus EARN was that the diffusion of computers within universities was causing scholars to become interested in communicating with their colleagues in other institutions so that they could share documents, programs and data in an informal way and work together and collaborate on new projects and writing papers. In so far as EARN was concerned membership was extended to include government-financed national and international research laboratories (8,12).

f. JANET (Joint Academic Network)

JANET is a wide-area computer network for the use of the academic and research institutes (including the British Library) in the United Kingdom. It has connections to virtually all such sites, though in many cases these connections are to local area networks to which the various services are connected. JANET provides gateways to PSS (the UK packet switching network), ARPANET, UUCP and EARN. The UK has a single EARN node at the Rutherford Appleton Laboratory which is also connected to JANET. Facilities provided via JANET include file transfer, electronic mail, job transfer and interactive services. Currently some 700 computers at 120 sites are connected.

JANET is strictly speaking not a network aimed primarily at the library and information community, however, it does provide library and information services and is used by the library community at large in the UK. Unlike EARN, JANET provides interactive working. This means that users can have access to online databases on both commercial and private hosts in the UK as well as abroad (via the PSS gateway). Once access to a host has been established to a host via JANET, searches can be effected and results downloaded for editing and enhancement before being despatched via the electronic mail system to end users (11). Online access is also possible to many university and polytechnic library catalogues as well as the British Library catalogues. These OPACs are designed to be used from any terminal on the network linking first to a campus mainframe and thence to the remote site. Since JANET is linked to PSS, then these catalogues can be accessed in principle from just about anywhere in the world (4). Since EARN is non-interactive, then access to a university library catalogue cannot be made through the EARN-JANET gateway, though file transfers and message exchange can be effected without trouble.

JANET is not a coherent information service, but merely a network connecting computers of the academic and research community. Thus while it provides useful facilities for searching online catalogues and databases, which coupled with the electronic mail system can be useful for interlibrary loans, it is difficult to find out what data exists on the network. And since services are not offered on a commercial basis, documentation and user support are limited (3). To help overcome this a JANET User Group for Libraries has been set up the members of which regularly interact over the system.

g. ADONIS

ADONIS (Automated Dialogue Organizational Science Information System) is a computer teleconferencing system available to specialists in the Soviet Union and other socialist countries. It is intended to be employed by users and producers of online databases in order to discuss day-to-day problems arising from and occurring with new facilities and information services. ADONIS sub-systems include: textual-graphic user interfaces; electronic mail; teleconferencing; personal and collective archiving; real-time data and message exchange; and a multi-lingual man-machine interface (21). The system was set up some two years ago in response to the need for efficient computerized communication between scientists throughout the Soviet bloc.

h. ALANET

ALANET is the American Library Association's electronic information system that was set up in 1984 to meet a need from the ALA's Executive Board for an effective, efficient and timely means of communication. The Board was geographically scattered and trying to communicate with members by phone or mail proved inefficient and time-consuming particularly when an important decision needed to be made quickly. Choosing the Dialcom system as a base, the ALA created a communication system not only for use by the Executive Board but also for the rank and file members of the ALA and the library community at large. The value of the system quickly became apparent to other Boards and groups who wished to keep communication paths with their members open. While electronic mail, with extensive uploading/downloading and file transfer features, forms the basis of ALANET, other components include the development of electronic newsletters to keep members informed on library issues; an interactive bulletin board; conference programme announcements and registration; customized interlibrary loan forms; as well as access to third party databases and other networks via gateways. ALANET is accessible via such networks as Telenet, Tymnet, Uninet, Datapac and other international packet switching networks (13).

I. OCTANET

OCTANET is a computer-based telecommunications network for the delivery of information services to the Midcontinental Region (Colorado, Kansas, Missouri, Nebraska, Utah and Wyoming) of the National Library of Medicine's Regional Medical Library network in the United States. It is a joint project of three entities and has functioned as a prototype for DOCLINE, a nationwide automated interlibrary loan system of the National Library of Medicine (NLM) - though this is due to be phased out in the near future. OCTANET has four main modules: interlibrary loan; electronic messaging; reporting; and union list production. The automated routing of interlibrary loan requests from regional borrowers to their resource libraries and NLM has seen the largest use of the OCTANET services, and though the electronic messaging module has been a functional component of the ILL module, it is also used by many individuals in user institutions for messages unrelated to ILL, such as workshop announcements and chit-chat (5).

7. CONCLUSION

This paper has explained something of the nature of communications, some of the factors involved in its flow and some of the reasons why people may want to communicate. Given these reasons and the three major communications channels (formal publication of journal papers; conferences; and informal, interpersonal communication) then it becomes clear why computer-based communication networks are being used more and more not only for informal communication between researchers and peers, but also as a speedy way of disseminating research results and papers to colleagues for discussion before eventual publication. As the networks described above show, they were brought into existence because there was an initial need for communication with a limited number of geographically-dispersed colleagues working in the same field or sharing some common goal or interest. But, while they still maintain their original purpose, they have grown to offer more services to more members, and by the interconnection and interlinking of networks, in an even wider geographic area. It is a characteristic of moribund research fields that they lack research and communication networks. Happily, the library and information area cannot be considered moribund judging by the number and scope of networks in it! Some of these networks have been briefly described in this paper.

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COMPUTER CONFERENCING FOR ENHANCED COMMUNICATION: ITS POTENTIAL FOR ACADEMIC AND RESEARCH COMMUNITIES

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COMPUTER CONFERENCING FOR ENHANCED COMMUNICATION: ITS POTENTIAL FOR ACADEMIC AND RESEARCH COMMUNITIES

ELLEN M. PEARSON
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Abstract

For users of electronic mail and teleconferencing, moving to computer-base conferring systems marks the next logical step in effective communication and information transfer. Recent advances in telecommunications now make it almost as easy to 'conference' around the corner. This presentation focuses on potential applications for the international scientific and academic community, as well as for those within an institution including joint preparation of papers, project management, technology transfer, electronic publishing, etc.

COMPUTER CONFERENCING FOR ENHANCED COMMUNICATION: ITS POTENTIAL FOR ACADEMIC AND RESEARCH COMMUNITIES

For those who use electronic communication such as telex or electronic 'mail', computer-based conferencing offers a real advance in level of sophistication of tools provided to assist in effective and efficient communication, transferring information, transacting business, getting together with colleagues, broadening horizons, time management - all of these things.

Just as electronic mail, (with its capabilities to store and forward, and to deliver messages simultaneously to more than one recipient) was a technical advance over telex, computer conferencing provides the next step:

- chronological storage
- logical relationships of text
- a growing database - participants build a database rather than merely exchanging blocks of text
- subject organization by general conferences
- subdivided by topics for focussed discussion
- the same equipment serves both conferencing and electronic mail
- retrieval later by keyword
- open/closed conferences, confidential conferences for security.

From the earlier conferencing systems that more closely represented ongoing electronic mail, computer-based conferencing systems have evolved as highly sophisticated communications tools, using the same equipment as electronic mail (a terminal or micro-computer with the capability of connecting to a tel-communications network via an acoustic coupler or software program).

This paper describes briefly the nature of computer conferencing, outlines the factors critical for success, and discusses some of the opportunities for information exchange provided by this technology.

Computer Conferencing:

Computer-based conferencing systems create an ongoing database of all text contributed by the conference members. Members may search for and retrieve stored text at any time. Typically, participation in the conference is asynchronous, with each member signing on once or twice a day at a time and place of his choosing. Each participant sees all the others' statements and may comment on those already entered and/or add new thoughts to the discussions. The conferencing system software tracks all entries, linking statements and comments thereto, so that members may read or proceed through the messages either chronologically or logically. The software also tracks each member's individual online session so that when he next joins or signs on, he is notified of the numbers of new or unread messages and need only press the 'enter' key to see them.

Conferencing systems may provide several types of conference: open (listed in the public index, anyone may join); closed (listed publically, but participation only by invitation or permission of the moderator); and confidential (not listed and participation restricted by the moderator). The last may even be stored in encrypted form.

The moderator creates the conference, sets up the agenda for discussion by inserting introductory paragraphs for each topic, and adds the initial group of participants or attendees. Like traditional face-to-face meetings, computer conferences profit under the leadership of an able moderator or chairman, but this is a topic for another time (3) (5). Suffice it to say that the moderator of a computer conference is perhaps even more important because none of the attendees is simultaneously or physically present to assist in conducting the meeting. The moderator must be very aware that his group is separated not only by time and distance, but also sometimes by language and culture. A transcript of the conference could be printed whenever required; for example, for distribution to those interested who were unable to join the electronic discussion. While offline participation lacks the immediacy of online attendance, it does enable interested by-standers to follow the discussions and to add their comments or questions through the direct participants.

Factors for success

Experience has demonstrated several factors essential to the success of a computer based conference. Generally speaking, they are specific to participants, and not, as might be expected, technical barriers:

1. the members of the group should want to communicate and must have something to say to each other

2. each member should have convenient and economic access to the basic equipment required

3. the conference itself must include a critical mass of participants, including a few leading figures who can enliven the discussion and encourage others to join an participate

4. the conferencing system must be easy to use and should be mounted on a computer that is robust and reliable

5. the conference moderator must be prepared to accept the responsibilities of his role

6. there must be support and commitment from the member's institution, including recognition that participating in a computer conference is potentially as valuable as other traditional measures in peer recognition and review

7. access to local technical advice at various levels so that the medium does not itself impede the scientific communication.

Advantages:

As effective use of computer conferencing increases and participation becomes more widespread, the advantages become more evident:

i) increased information exchange, and sharing of data

II) more intensive collaboration across distances because of the savings in travel costs, and the relatively low incremental cost of adding one more person to a group

III) larger numbers can view and comment on a proposal within a few days

IV) participants from various language groups may find written text easier to understand than spoken words; written text facilitates clearer communication

V) all participants have equal opportunity to contribute or to present their viewpoint; comments can be more careful prepared than in a traditional face-to-face meeting when unscheduled topics arise.

Applications:

The applications or techniques of computer conferencing are as varied as its users:

1. first, and most significant, is the information exchange and database building of the subject-oriented conference. As a potential example for this, one might consider an ongoing knowledge or information control problem very much in the scientific news these days. Indeed, one of the scientists directly involved was recently awarded the Nobel Prize for Physics. The frenetic research activity in superconductivity that has arisen in the last 20 months presently gives rise to perhaps 150-200 publications per month. This activity has been generated by the discovery that superconductivity can apparently occur by a mechanism not limited by thermal vibrations, thus allowing the possibility that it might be found to occur even at room temperatures. Experimental and theoretical developments have been generated at a greater rate than can be handled by conventional publication methods. If, say, there are 10 to 15 to 20 major laboratories or institutes in Germany working on this problem (and I can think of several myself), what better means of intercommunication than a computer conference among them on this subject.

2. Joint authorship - all authors would participate in a confidential conference for preliminary discussion of the paper or project; each would participate by reading and commenting on specific points or paragraphs.

Blocks of text could be downloaded by any members, edited, new text added, and the finished input uploaded to the conference again. Conference topics could be used to differentiate among abstract, introduction, methodology, conclusions, summary, etc. At least one conferencing system provides a common entry area or workpad that permits online editing of the text stored therein by all the members of the specific conference. When the authors have agreed on the 'finished product' , the paper could then be downloaded or printed, if necessary, at one institution, or even forwarded electronically to the journal itself.

3. Electronic publishing - following from the above, computer conferencing could provide an effective link among journal editors, and between an editor and each of his referees, including delivery of the paper to be refereed.

4. Project management - computer conferencing promotes effective and ongoing communication among management teams, even if all members are located in the same institution, and especially if they are not. The following are only a few of the many examples of applications:

i) SAM'S CLUB (System of Automatic Message Switching for Communicating Lucidly with Brevity) was set up to improve communication among individuals in several countries involved in planning and managing. It was used as an alternative to and extension of traditional telephone, telegraph and face-to-face communication - as a timely management tool assisting a co-operative international information system.

ii) Similarly, the International Energy Agency Bioenergy Project linked laboratories in 5 countries (Sweden, Austria, Canada, New Zealand, and the United States). Communications have included collaboration on the design and operation of experiments, arranging shipments of samples, collaborative report writing, planning face-to-face meetings and various informal (but nonetheless important) exchanges among participants.

5. Technology and information transfer - computer conferencing can facilitate the sharing of information. The International Computer Conference on the Bio-conversion of Lignocellulosics for Fuel, Fodder and Food is an example of a six-month electronic meeting of some 200 scientists from a wide diversity of countries (1).

6. Teaching tool: Professors and students can belong to a conference created to support a specific University course. All students can then share in the information provided by the professor, reading one question may spark another student to ask a related but different question, or building on the discussion, raise another aspect of the situation or topic being discussed. The database created during the term could provide useful information to assist the professor in his lecture presentations the next time the course is offered. In addition, the messaging interchange provided by the computer conferencing system could reduce the frustration level of students with unanswered questions who may not easily locate the professor after the class period. I a paper prepared for the Association for Media and Technology in Education in Canada, McCreary and Van Duren (6) identified 10 distinct uses of conferencing, each of which serves a separate educational function. These are listed more or less in order from least to most difficult to implement:

1. The Notice Board - office hours, advance readings, assignment due dates, material on reserve in the Library, important points to review for exams, etc.

2. The Public Tutorial - the professor provides a much more detailed discussion or response once, for all members of the class.

3. Individual Projects - conversation between two or more students working on one project.

4. Free-flow Discussion

5. The Structured Seminar - topics structured to course material; very useful for distance students.

6. Peer Counseling

7. Collective Database - student listing of journals, annotated bibliography, directory of services, calendar of events, etc.

8. Group Project - case study preparation

9. Community Decision Making - managing audio-visual equipment, nominees for

visiting faculty; scheduling exams, thesis defence; where to hold the final class party!

10. Intercommunity Networking - there is a potential for linkages between similar academic groups at different universities to promote common research and scholarly interests.

7. General administration or management - at the University of Guelph Library, more than 60 staff members have individual accounts on CoSy, the Campus Conferencing System. Conference names include: LAC (Library Administrative Council), divheads (the middle management group), Sups (the line Supervisors), jobs (set up by the Building Manager to include problem reporting, equipment maintenance, furniture moves, housekeeping, etc.); BBoard (the library's internal bulletin board for current information); LIBSYS (topics for each of the library system modules, OPAC, Circ, Reserve, Acquisitions, CD-ROM, etc.); Libtalk (the electronic question and answer board open to all CoSy users); Copyright (information pertinent to copyright applications within the library); various co-ordinating or project-oriented conferences created by groups within the library; conferences between individuals or among small groups to meet a specific purpose or timetable; Interlibrary Loans (between participating universities); projects or text input by library staff for the secretaries to finish in a word processing package outside the actual conferencing system.

Conclusion:

Computer-based conferencing lies somewhere between a traditional meeting and a frequently published newsletter. Using computer conferencing to assist in effective communication and information transfer is a logical advance and enhancement for users of teleconferencing and electronic 'mail'. In addition, the recent advances in telecommunication make it almost as easy to 'conference' electronically with colleagues around the globe as with those around the corner, and the applications of this powerful communication tool can be as varied as its users' needs and imaginations.

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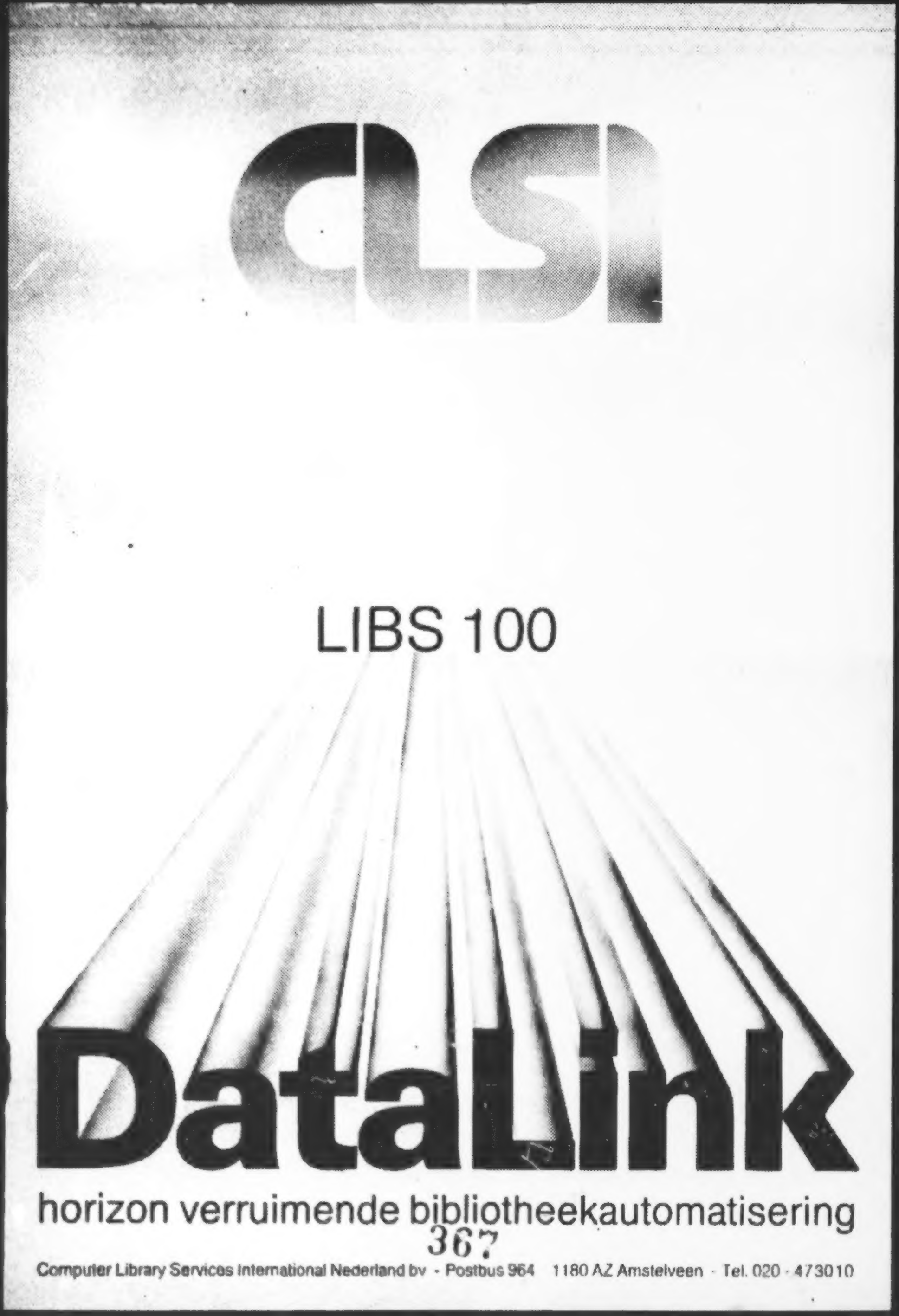

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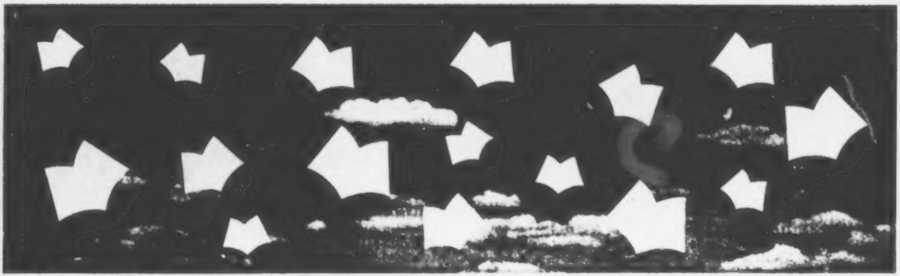

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